

MEMORANDUM

DATE August 6, 2019

JOB NO. 2017-0069

TO Conservation Commission
Town of Arlington
730 Mass Ave. Annex
Arlington, MA 02476

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Reeds Brook Sediment and Surface Water Assessment

Woods Hole Group was contracted to sample the sediments and surface waters at Reeds Brook, and evaluate the results of chemical analyses in the context of ecological risk. This technical memorandum summarizes the sampling activities, relevant site observations, and the results of comparisons of Site concentrations of metals in sediments and surface waters to relevant screening benchmarks and criteria. This technical memorandum does not constitute a risk assessment, but does provide information that would be relevant to a MCP Stage I Environmental Risk Characterization (ERC).

Woods Hole Group collected Spring (5/30/18) and Fall (12/4/18) surface water samples to characterize metals contamination and seasonal variability in Reeds Brook Site and upstream surface water. Woods Hole Group also collected sediment samples (12/4/18) in Reeds Brook Site and upstream locations to assess metals contamination. During the sediment sampling event, Woods Hole Group made observations of the nature and extent of iron flocculation.

A. Flocculation Summary

As detailed in the “Reeds Brook Fall 2018 Sediment Observations” technical memorandum (dated 12/18/18), iron flocculation and diffuse sediment grain staining are present in some areas of Reeds Brook at the Site, but are not present in any upstream areas. The iron flocculation occurring on Reeds Brook Site sediments appeared to be loose, surficial in nature, and transient. Observed on sediments in the eastern and western reaches of Reeds Brook (but not in the central portion), the floc was predominantly a loose dull orange organic floc that had settled in and among the organic debris and vegetation in the streambed and detention pond. The loose floc was easily disturbed and likely flushes out of Reeds Brook periodically with larger rain events. Additionally, an abundant and diverse biological community was observed inhabiting the Reeds Brook sediments, utilizing the Reeds Brook detention basins, and foraging at the Site. Based on this evidence, Woods Hole Group concluded that the observed iron flocculation at Reeds Brook does not constitute a condition of readily apparent harm.



Figure 1: Presence/Absence of Iron Flocculent in Reeds Brook and Upstream Wetland.

B. Sediment and Surface Water Sampling

Surface water sampling occurred on May 30, 2018 and December 4, 2018; sediment sampling occurred on December 4, 2018. Sample collection and analysis methods are detailed in the Sampling and Analysis Plan (original dated 12/4/17, addendum dated 10/29/18). Surface water samples were collected by hand dipping clean unpreserved sample bottles unless water quality parameters indicated a stratification in the water column (which occurred in the middle of Reeds Brook (MP-RB-SW-08) during the December sampling event. When water was stratified, a second sample was collected from approximately the middle of the lower layer using a Kemmerer sampling device. Sediment samples were collected using a petite ponar or an Ekman on a stick. Surface water samples were analyzed by Alpha Analytical for dissolved metals (RCRA 8 plus copper, iron, manganese, and zinc), and hardness was calculated from dissolved calcium and magnesium. Sediment samples were analyzed by Alpha Analytical for total metals (RCRA 8 plus copper, iron, manganese, and zinc), grain size, and total organic carbon.



Figure 2: Sediment and Surface Water Sampling Locations.

C. Sediment Results

Sediments from Reeds Brook were generally mixtures of silt and sand with total organic carbon ranging from 3% to 10%. Stations RB-03, RB-06, and RB-08 had proportionally more fines, while station RB-05 in the detention basin had coarser material. Sediments from the Upstream Wetland were predominantly sand with some silt and much higher total organic carbon (32%), likely due to decomposing wetland vegetation and leaf litter.

Station RB-08 in the center of Reeds Brook exhibited maximum concentrations for Reeds Brook stations for almost all metals measured. Detected concentrations of metals in Reeds Brook exceeded MADEP Freshwater Sediment Screening Benchmarks for arsenic (RB-08), lead (RB-04, RB-05, RB-06, RB-07, and RB-08), and zinc (RB-07). Due to high moisture content and low percent solids, the sample-specific reporting limits exceeded the screening benchmark for mercury at all Reeds Brook stations. Based on prior sampling in Reeds Brook (Brown & Caldwell, 2017) we do not expect mercury to be an issue for Reeds Brook sediments, however this does present an uncertainty for the present evaluation.

Detected concentrations of metals in the Upstream Wetland exceeded MADEP Freshwater Sediment Screening Benchmarks for copper, lead, mercury, and zinc. Metals concentrations in the Upstream Wetland were generally



consistent with or higher than concentrations in Reeds Brook. Concentrations detected in the Upstream Wetland were higher than Reeds Brook for barium, cadmium, copper, lead, mercury, and zinc.

Table 1. Sediment Analytical Results and Comparison to MADEP Screening Benchmarks.

| Analyte | Units | MADEP Screening Benchmark | REEDS BROOK DETENTION BASINS | | | | | | | | UPSTREAM WETLAND |
|-----------------------------|-------|---------------------------|------------------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|------------------|
| | | | MP-RB-SED-03-120418 | MP-RB-SED-04-120418 | MP-RB-SED-05-120418 | MP-RB-SED-06-120418 | MP-RB-SED-07-120418 | MP-RB-SED-07FD-120418 | MP-RB-SED-08-120418 | MP-UW-SED-02-120418 | |
| | | | Result | Result | Result | Result | Result | Result | Result | Result | |
| Arsenic, Total | mg/kg | 33 | 17.2 J | 11.7 J | 20.3 J | 18.6 J | 15.7 J | 25.3 J | 41.5 J | 6.28 J | |
| Barium, Total | mg/kg | NA | 121 J | 62.2 J | 136 J | 142 J | 78 J | 121 J | 228 J | 345 J | |
| Cadmium, Total | mg/kg | 5 | 1.206 J | 0.7952 UJ | 0.9752 J | 1.131 J | 1.237 J | 0.9519 UJ | 2.05 J | 3.802 J | |
| Chromium, Total | mg/kg | 110 | 66.7 J | 26.2 J | 56.5 J | 69.2 J | 32.5 J | 51.3 J | 89.9 J | 23.3 J | |
| Copper, Total | mg/kg | 150 | 72.3 J | 39.9 J | 85.9 J | 74.5 J | 48 J | 74.1 J | 101 J | 235 J | |
| Iron, Total | mg/kg | NA | 60100 J | 31000 J | 46100 J | 64200 J | 37800 J | 57800 J | 212000 J | 72800 J | |
| Lead, Total | mg/kg | 130 | 111 J | 159 J | 320 J | 146 J | 114 J | 163 J | 171 J | 472 J | |
| Manganese, Total | mg/kg | NA | 356 J | 378 J | 454 J | 422 J | 392 J | 671 J | 807 J | 186 J | |
| Mercury, Total | mg/kg | 0.18 | 0.26 UJ | 0.262 UJ | 0.307 UJ | 0.345 UJ | 0.289 UJ | 0.32 UJ | 0.38 UJ | 0.681 J | |
| Selenium, Total | mg/kg | NA | 7.97 UJ | 7.95 UJ | 9.39 UJ | 10.2 UJ | 8.7 UJ | 9.52 UJ | 11.2 UJ | 19 UJ | |
| Silver, Total | mg/kg | NA | 1.99 UJ | 1.99 UJ | 2.35 UJ | 2.56 UJ | 2.18 UJ | 2.38 UJ | 2.79 UJ | 4.75 UJ | |
| Zinc, Total | mg/kg | 460 | 358 J | 185 J | 305 J | 356 J | 484 J | 264 J | 431 J | 785 J | |
| % Clay Fine | % | - | 8.3 | 4.3 | 7.3 | 8.4 | 3.3 | 3.4 | 17.1 | 8.3 | |
| % Silt Fine | % | - | 32.6 | 11.2 | 15.6 | 31.4 | 9.3 | 16.1 | 35.6 | 5.6 | |
| % Fine Sand | % | - | 32.8 | 51.1 | 23.7 | 34.2 | 28.7 | 32.1 | 13.4 | 26.1 | |
| % Medium Sand | % | - | 20.8 | 28 | 22.3 | 21.6 | 38.2 | 29.4 | 28.9 | 42.4 | |
| % Coarse Sand | % | - | 4.8 | 4.5 | 11.9 | 4.1 | 18.9 | 12.2 | 5 | 14.3 | |
| % Fine Gravel | % | - | 0.7 | 0.9 | 19.2 | 0.3 | 1.6 | 6.8 | 0.1 U | 3.3 | |
| % Coarse Gravel | % | - | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | |
| % Cobbles | % | - | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | |
| % Total Fines | % | - | 40.9 | 15.5 | 22.9 | 39.8 | 12.6 | 19.5 | 52.7 | 13.9 | |
| % Total Sand | % | - | 58.4 | 83.6 | 57.9 | 59.9 | 85.8 | 73.7 | 47.3 | 82.8 | |
| % Total Gravel | % | - | 0.7 | 0.9 | 19.2 | 0.3 | 1.6 | 6.8 | 0.1 U | 3.3 | |
| Total Organic Carbon (Rep1) | % | - | 11.8 | 3.47 | 4.27 | 6.26 | 4.75 | 3.78 | 10.3 | 31.8 | |
| Total Organic Carbon (Rep2) | % | - | 11.2 | 4.24 | 5.56 | 7.82 | 4.83 | 4.29 | 10.1 | 31.9 | |
| Solids, Total | % | - | 24.5 | 24 | 20.8 | 18.5 | 22.1 | 19.6 | 16.7 | 9.97 | |

D. Surface Water Results

Surface Water was collected from Reeds Brook and the Upstream Wetland in the Spring and Fall of 2018. An additional upstream area of Reeds Brook behind Dothan Street was sampled in the Spring only. Cadmium, lead, mercury, selenium, and silver were not detected in any surface water samples at Reeds Brook. Concentrations of dissolved iron, manganese, and zinc were highest at station proximate to (or in) stormwater outfalls (RB-03 and RB-06). Concentrations of other detected dissolved metals were generally consistent across stations and sampling events. Overall, surface water concentrations of dissolved metals were higher during the Spring sampling event than the late fall event. It was noted that the Fall sampling event occurred a few days after a rain event, so it is possible that surface water had been diluted by rain. In the deeper portion of Reeds Brook (RB-08), surface water was stratified and there was a bottom layer of high salinity (and slightly warmer) water exhibiting high metals concentrations. This high salinity layer may indicate a slug of recent stormwater input to Reeds Brook, assuming roads were pre-treated with salt ahead of a potential snow storm.

Iron exceeded the National Recommended Water Quality Criterion in all Reeds Brook samples except the May 2018 samples from RB-01, RB-02, and RB-04. No other exceedances of NRWQC occurred in Reeds Brook. There were also no exceedances of NRWQC in the Dothan Street upstream station at Reeds Brook.



The Upstream Wetland exhibited generally higher concentrations of dissolved metals than Reeds Brook. In fact, the highest concentration of iron measured (31.8 mg/L) was from the Spring sample at UW-01. Iron exceeded the NRWQC in all Upstream Wetland samples. Copper, lead, and zinc also exceeded the NRWQC in both Fall samples from the Upstream Wetland.

Table 2a. Surface Water Analytical Results and Comparison to NRWQC.

| Analyte | Units | UPSTREAM DOTHAN | | | | REEDS BROOK DETENTION BASINS | | | | | | | | | | | | | |
|-------------|-------|--------------------|-----|---------|--------|------------------------------|---------|----------------------|-----|--------------------|--------|---------------------------|---------|--------------------|-----|---------|--------|---|---------|
| | | MP-DO-SW-01-053018 | | | | MP-RB-SW-01-053018 | | MP-RB-SW-01-D-053018 | | MP-RB-SW-01-120418 | | MP-RB-SW-02-MS/MSD-053018 | | MP-RB-SW-02-120418 | | | | | |
| | | Result | CCC | | | Result | CCC | Result | CCC | Result | CCC | Result | CCC | Result | CCC | | | | |
| Hardness | mg/L | 84.2 | | | 145 | | | 150 | | | 109 | | | 148 | | | 98.8 | | |
| Arsenic | mg/L | 0.0005 | U | 0.15 | 0.0005 | | 0.15 | 0.0005 | | 0.15 | 0.0005 | U | 0.15 | 0.0008 | | 0.15 | 0.0005 | U | 0.15 |
| Barium | mg/L | 0.0292 | | | 0.1016 | | | 0.1067 | | | 0.069 | | | 0.0977 | | | 0.0522 | | |
| Cadmium | mg/L | 0.0005 | U | 0.00063 | 0.0005 | U | 0.0010 | 0.0005 | U | 0.0010 | 0.0005 | U | 0.00077 | 0.0005 | U | 0.0010 | 0.0005 | U | 0.0007 |
| Chromium VI | mg/L | 0.001 | U | 0.011 | 0.001 | U | 0.011 | 0.001 | U | 0.011 | 0.0012 | | 0.011 | 0.001 | U | 0.011 | 0.0015 | | 0.011 |
| Copper | mg/L | 0.0015 | | 0.0077 | 0.001 | U | 0.012 | 0.001 | U | 0.013 | 0.0024 | | 0.0096 | 0.001 | U | 0.013 | 0.0022 | | 0.0089 |
| Iron | mg/L | 0.341 | | 1.0 | 0.285 | | 1.0 | 0.235 | | 1.0 | 1.8 | | 1.0 | 0.184 | | 1.0 | 1.69 | | 1.0 |
| Lead | mg/L | 0.001 | U | 0.0021 | 0.001 | U | 0.0038 | 0.001 | U | 0.0039 | 0.001 | U | 0.0028 | 0.001 | U | 0.0038 | 0.001 | U | 0.0025 |
| Manganese | mg/L | 0.1036 | | | 0.2529 | | | 0.2547 | | | 0.1872 | | | 0.2485 | | | 0.1407 | | |
| Mercury | mg/L | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 |
| Selenium | mg/L | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 |
| Silver | mg/L | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | |
| Zinc | mg/L | 0.0121 | | 0.10 | 0.01 | U | 0.16 | 0.01 | U | 0.17 | 0.0172 | U | 0.13 | 0.01 | U | 0.16 | 0.0173 | U | 0.12 |

Table 2b. Surface Water Analytical Results and Comparison to NRWQC (continued).

| Analyte | Units | REEDS BROOK DETENTION BASINS | | | | | | | | | | | | | | | | | |
|-------------|-------|------------------------------|-----|--------------------|--------|--------------------|---------|--------------------|-----|--------------------|--------|--------------------|---------|--------|---|---------|--------|---|---------|
| | | MP-RB-SW-03-053018 | | MP-RB-SW-03-120418 | | MP-RB-SW-04-053018 | | MP-RB-SW-04-120418 | | MP-RB-SW-05-053018 | | MP-RB-SW-05-120418 | | | | | | | |
| | | Result | CCC | Result | CCC | Result | CCC | Result | CCC | Result | CCC | Result | CCC | | | | | | |
| Hardness | mg/L | 191 | | 81.6 | | 144 | | 91 | | 111 | | 88.2 | | | | | | | |
| Arsenic | mg/L | 0.0006 | | 0.15 | 0.0005 | U | 0.15 | 0.0006 | | 0.15 | 0.0005 | U | 0.15 | | | | | | |
| Barium | mg/L | 0.1472 | | | 0.0508 | | | 0.1026 | | | 0.0519 | | | 0.0787 | | 0.046 | | | |
| Cadmium | mg/L | 0.0005 | U | 0.0012 | 0.0005 | U | 0.0006 | 0.0005 | U | 0.00090 | 0.0005 | U | 0.0007 | 0.0005 | U | 0.00080 | 0.0005 | U | 0.0007 |
| Chromium VI | mg/L | 0.001 | U | 0.011 | 0.0021 | | 0.011 | 0.001 | U | 0.011 | 0.0017 | | 0.011 | 0.001 | U | 0.011 | 0.0016 | | 0.011 |
| Copper | mg/L | 0.001 | U | 0.016 | 0.002 | | 0.0075 | 0.001 | U | 0.012 | 0.0021 | | 0.0083 | 0.001 | U | 0.010 | 0.0019 | | 0.0080 |
| Iron | mg/L | 7.1 | | 1.0 | 2 | | 1.0 | 0.196 | | 1.0 | 1.85 | | 1.0 | 2.59 | | 1.0 | 1.72 | | 1.0 |
| Lead | mg/L | 0.001 | U | 0.0051 | 0.001 | U | 0.0020 | 0.001 | U | 0.0037 | 0.001 | U | 0.0023 | 0.001 | U | 0.0028 | 0.001 | U | 0.0022 |
| Manganese | mg/L | 0.4564 | | | 0.0977 | | | 0.2583 | | | 0.121 | | | 0.2408 | | | 0.1073 | | |
| Mercury | mg/L | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 | 0.0002 | U | 0.00077 |
| Selenium | mg/L | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 | 0.005 | U | 0.0046 |
| Silver | mg/L | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | | 0.0005 | U | |
| Zinc | mg/L | 0.188 | | 0.20 | 0.0247 | | 0.099 | 0.01 | U | 0.16 | 0.0206 | U | 0.11 | 0.01 | U | 0.13 | 0.0104 | U | 0.11 |



Table 2c. Surface Water Analytical Results and Comparison to NRWQC (continued).

| Analyte | Units | REEDS BROOK DETENTION BASINS | | | | | | | | | | | |
|-------------|-------|------------------------------|-----|--------------------|-----|--------------------|-----|----------------------|-----|--------------------|-----|---------------------|-----|
| | | MP-RB-SW-06-053018 | | MP-RB-SW-06-120418 | | MP-RB-SW-07-120418 | | MP-RB-SW-07FD-120418 | | MP-RB-SW-08-120418 | | MP-RB-SW-08L-120418 | |
| | | Result | CCC | Result | CCC | Result | CCC | Result | CCC | Result | CCC | Result | CCC |
| Hardness | mg/L | 129 | | 97.2 | | 95.2 | | 95 | | 91.9 | | 132 | |
| Arsenic | mg/L | 0.0005 | U | 0.0005 | U | 0.0005 | U | 0.0005 | U | 0.0005 | U | 0.0005 | U |
| Barium | mg/L | 0.0889 | | 0.0554 | | 0.0548 | | 0.0536 | | 0.0518 | | 0.0844 | |
| Cadmium | mg/L | 0.0005 | U | 0.0009 | U | 0.0007 | U | 0.0007 | U | 0.0005 | U | 0.0005 | U |
| Chromium VI | mg/L | 0.001 | U | 0.011 | U | 0.0026 | U | 0.011 | U | 0.0015 | U | 0.011 | U |
| Copper | mg/L | 0.0011 | | 0.011 | | 0.0021 | | 0.0087 | | 0.0018 | | 0.0086 | |
| Iron | mg/L | 8.07 | | 1.0 | | 4.63 | | 1.0 | | 1.79 | | 1.0 | |
| Lead | mg/L | 0.001 | U | 0.0033 | U | 0.001 | U | 0.0024 | U | 0.001 | U | 0.0023 | U |
| Manganese | mg/L | 0.1298 | | 0.1044 | | 0.1374 | | 0.1351 | | 0.1174 | | 0.4888 | |
| Mercury | mg/L | 0.0002 | U | 0.00077 | U | 0.0002 | U | 0.00077 | U | 0.0002 | U | 0.00077 | U |
| Selenium | mg/L | 0.005 | U | 0.0046 | U | 0.005 | U | 0.0046 | U | 0.005 | U | 0.0046 | U |
| Silver | mg/L | 0.0005 | U | 0.0005 | U | 0.0005 | U | 0.0005 | U | 0.0005 | U | 0.0005 | U |
| Zinc | mg/L | 0.0131 | | 0.15 | | 0.0205 | U | 0.12 | U | 0.0182 | U | 0.11 | U |

Table 2d. Surface Water Analytical Results and Comparison to NRWQC (continued).

| Analyte | Units | UPSTREAM WETLAND | | | | | |
|-------------|-------|--------------------|-----|--------------------|-----|--------------------|-----|
| | | MP-UW-SW-01-053018 | | MP-UW-SW-01-120418 | | MP-UW-SW-02-120418 | |
| | | Result | CCC | Result | CCC | Result | CCC |
| Hardness | mg/L | 200 | | 62.4 | | 116 | |
| Arsenic | mg/L | 0.0005 | U | 0.15 | U | 0.0009 | U |
| Barium | mg/L | 0.2876 | | 0.0941 | | 0.1278 | |
| Cadmium | mg/L | 0.0005 | U | 0.0012 | U | 0.0005 | U |
| Chromium VI | mg/L | 0.001 | U | 0.011 | U | 0.001 | U |
| Copper | mg/L | 0.0014 | | 0.016 | | 0.0074 | |
| Iron | mg/L | 31.8 | | 1.0 | | 1.91 | |
| Lead | mg/L | 0.001 | U | 0.0053 | U | 0.0018 | U |
| Manganese | mg/L | 0.4908 | | 0.1946 | | 0.0015 | |
| Mercury | mg/L | 0.0002 | U | 0.00077 | U | 0.0002 | U |
| Selenium | mg/L | 0.005 | U | 0.0046 | U | 0.0006 | U |
| Silver | mg/L | 0.0005 | U | 0.0005 | U | 0.0014 | U |
| Zinc | mg/L | 0.01 | U | 0.21 | U | 0.0060 | U |

**Table 3. Water Quality Parameters.**

| Station | Date | Time | °C | mmHg | DO % | DO mg/L | SPC-uS/cm | pH | ORP mV | NTU | DEP m |
|--------------------------|-----------|-------------|------|-------|-------|---------|-----------|------|--------|-------|-------|
| MP-DO-SW-01-053018 | 5/30/2018 | 12:02:44 PM | 15.4 | 761.7 | 56.1 | 5.6 | 808 | 6.8 | -7.1 | 0.6 | ~0.3 |
| MP-RB-SW-01-053018 | 5/30/2018 | 12:51:23 PM | 24.6 | 761.9 | 76.7 | 6.36 | 1619 | 6.78 | -15.9 | 14.2 | ~0.3 |
| MP-RB-SW-02-MS/MD-053018 | 5/30/2018 | 1:18:22 PM | 24.3 | 761.8 | 95 | 7.92 | 1620 | 6.75 | -6.2 | 26.7 | ~0.3 |
| MP-RB-SW-02-MS/MD-053018 | 5/30/2018 | 1:18:25 PM | 24.3 | 761.8 | 95.3 | 7.94 | 1619 | 6.75 | -6.2 | 26 | ~0.3 |
| MP-RB-SW-02-MS/MD-053018 | 5/30/2018 | 1:18:26 PM | 24.3 | 761.8 | 95.4 | 7.94 | 1618 | 6.75 | -6.2 | 25.9 | ~0.3 |
| MP-RB-SW-03-053018 | 5/30/2018 | 2:12:35 PM | 13.4 | 761.5 | 13 | 1.35 | 1538 | 6.33 | -49.6 | 24.4 | ~0.3 |
| MP-RB-SW-03-053018 | 5/30/2018 | 2:12:35 PM | 13.4 | 761.5 | 13 | 1.35 | 1537 | 6.33 | -49.5 | 24.5 | ~0.3 |
| MP-RB-SW-03-053018 | 5/30/2018 | 2:12:35 PM | 13.4 | 761.5 | 12.9 | 1.35 | 1537 | 6.33 | -49.5 | 24.6 | ~0.3 |
| MP-RB-SW-04-053018 | 5/30/2018 | 2:36:23 PM | 24.7 | 761.3 | 90.2 | 7.46 | 1631 | 6.79 | -10.5 | 19.6 | ~0.3 |
| MP-RB-SW-05-053018 | 5/30/2018 | 2:51:47 PM | 29.3 | 761.2 | 31.7 | 2.42 | 1088 | 6.9 | 5.7 | 71.4 | ~0.3 |
| MP-RB-SW-06-053018 | 5/30/2018 | 3:09:04 PM | 13.5 | 761.2 | 64.1 | 6.66 | 1183 | 6.56 | -49.1 | 1.2 | ~0.3 |
| MP-UW-SW-01-053018 | 5/30/2018 | 3:57:28 PM | 16.8 | 760.7 | 2.5 | 0.24 | 1937 | 6.75 | -157.4 | 141 | ~0.3 |
| MP-RB-SW-01-120418 | 12/4/2018 | 9:08:00 AM | 6.49 | 751.2 | 60.8 | 7.45 | 1136 | 7.43 | 58.8 | -11.2 | 0.274 |
| MP-RB-SW-02-120419 | 12/4/2018 | 9:19:00 AM | 5.32 | 750.9 | 78.9 | 9.97 | 877 | 7.46 | -310.6 | -11.1 | 0.284 |
| MP-RB-SW-03-120419 | 12/4/2018 | 9:35:00 AM | 7.7 | 750.9 | 84.9 | 10.1 | 804 | 7.22 | -230.9 | 3.2 | 0.28 |
| MP-RB-SW-04-120419 | 12/4/2018 | 10:08:00 AM | 5.03 | 751.1 | 74.6 | 9.5 | 817 | 6.96 | -191.6 | -13 | 0.267 |
| MP-RB-SW-05-120419 | 12/4/2018 | 10:18:00 AM | 5.03 | 731.6 | 79.3 | 10.09 | 686 | 6.94 | -213.4 | -1.9 | 0.296 |
| MP-RB-SW-06-120419 | 12/4/2018 | 10:30:00 AM | 7.41 | 751.2 | 101.6 | 12.18 | 756 | 6.93 | -189.7 | -18 | 0.294 |
| MP-RB-SW-07-120419 | 12/4/2018 | 9:53:00 AM | 5.36 | 750.9 | 91.9 | 11.6 | 819 | 7.12 | -236.7 | -13.4 | 0.261 |
| MP-RB-SW-08-120419 | 12/4/2018 | 10:42:00 AM | 5.58 | 751.2 | 84.8 | 10.64 | 823 | 7.08 | -172.3 | -14.1 | 0.473 |
| MP-RB-SW-08L-120419 | 12/4/2018 | 10:48:00 AM | 9.17 | 751.3 | 35.2 | 3.84 | 14030 | 7.08 | -223.1 | -13.2 | 1.174 |
| MP-UW-SW-01-120418 | 12/4/2018 | 11:49:00 AM | 4.15 | 751.1 | 47.1 | 6.13 | 905 | 7.29 | -368.6 | -16.6 | 0.276 |
| MP-UW-SW-02-120419 | 12/4/2018 | 12:03:00 PM | 4.7 | 751.1 | 35.5 | 4.55 | 785 | 6.87 | -345.5 | -16.1 | 0.26 |

E. Summary of 2018 Fieldwork Investigation

Woods Hole Group sampled surface water and sediments from Reeds Brook detention basins and upstream locations. Analysis of metals in these media at the Site returned NRWQC exceedances for iron, and exceedances of MADEP sediment benchmarks for arsenic, lead, and zinc. Given the patterns on contamination, two potential contributing sources emerged: (1) the stormwater drainage and outfall system, and (2) the upstream wetland. Groundwater results from the landfill side of Reeds Brook and the Upstream Wetland would contribute to a better understanding of these results may help determine whether the original source of contamination in Reeds Brook and the Upstream Wetland is the former landfill or urban stormwater runoff and deteriorating/unmaintained infrastructure. If it is determined that stormwater and stormwater infrastructure is contributing to Reeds Brook contamination, a crucial step in controlling this source will be to implement the relevant Best Management Practices (BMPs) outlined in the Town of Arlington's 2004 Stormwater Management Program.

Attachments:

Spring Surface Water Laboratory Report

Late Fall Surface Water and Sediment Laboratory Report



ANALYTICAL REPORT

| | |
|-----------------|---|
| Lab Number: | L1819964 |
| Client: | Woods Hole Group 81 Technology Park Drive East Falmouth, MA 02536 |
| ATTN: | Joseph Famely |
| Phone: | (508) 495-6220 |
| Project Name: | MCCLENNEN PARK |
| Project Number: | Not Specified |
| Report Date: | 06/12/18 |

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: MCCLENNEN PARK
Project Number: Not Specified

Lab Number: L1819964
Report Date: 06/12/18

| Alpha Sample ID | Client ID | Matrix | Sample Location | Collection Date/Time | Receive Date |
|--------------------|-------------------------------|--------|--------------------|-------------------------|--------------|
| L1819964-01 | MP-DO-SW-01-053018 | WATER | ARLINGTON, MA | 05/30/18 11:55 | 05/31/18 |
| L1819964-02 | MP-RB-SW-01-053018 | WATER | ARLINGTON, MA | 05/30/18 12:54 | 05/31/18 |
| L1819964-03 | MP-RB-SW-01-D-053018 | WATER | ARLINGTON, MA | 05/30/18 12:56 | 05/31/18 |
| L1819964-04 | MP-RB-SW-02-MS/MSD- 053018 | WATER | ARLINGTON, MA | 05/30/18 13:20 | 05/31/18 |
| L1819964-05 | MP-RB-SW-03-053018 | WATER | ARLINGTON, MA | 05/30/18 14:15 | 05/31/18 |
| L1819964-06 | MP-RB-SW-04-053018 | WATER | ARLINGTON, MA | 05/30/18 14:40 | 05/31/18 |
| L1819964-07 | MP-RB-SW-05-053018 | WATER | ARLINGTON, MA | 05/30/18 14:55 | 05/31/18 |
| L1819964-08 | MP-RB-SW-06-053018 | WATER | ARLINGTON, MA | 05/30/18 15:15 | 05/31/18 |
| L1819964-09 | MP-UW-SW-01-053018 | WATER | ARLINGTON, MA | 05/30/18 16:00 | 05/31/18 |

Project Name: MCCLENNEN PARK

Lab Number: L1819964

Project Number: Not Specified

Report Date: 06/12/18

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

| | | |
|--|---|-----|
| An affirmative response to questions A through F is required for "Presumptive Certainty" status | | |
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | YES |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | YES |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | YES |
| D | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?" | YES |
| E a. | VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). | N/A |
| E b. | APH and TO-15 Methods only: Was the complete analyte list reported for each method? | N/A |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | YES |
| A response to questions G, H and I is required for "Presumptive Certainty" status | | |
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | YES |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | YES |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | NO |
| For any questions answered "No", please refer to the case narrative section on the following page(s). | | |

Please note that sample matrix information is located in the Sample Results section of this report.



Project Name: MCCLENNEN PARK
Project Number: Not Specified

Lab Number: L1819964
Report Date: 06/12/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: MCCLENNEN PARK
Project Number: Not Specified

Lab Number: L1819964
Report Date: 06/12/18

Case Narrative (continued)

MCP Related Narratives

Dissolved Metals

In reference to question I:

All samples were analyzed for a subset of MCP analytes per client request.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Kelly Stenstrom

Title: Technical Director/Representative

Date: 06/12/18

METALS

Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-01

Date Collected: 05/30/18 11:55

Client ID: MP-DO-SW-01-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.0292 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | 0.0015 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 0.341 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.1036 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:19 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | 0.0121 | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:13 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 84.2 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 21:26 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-02

Date Collected: 05/30/18 12:54

Client ID: MP-RB-SW-01-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0005 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.1016 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 0.285 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.2529 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:21 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:18 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 145 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 21:31 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-03

Date Collected: 05/30/18 12:56

Client ID: MP-RB-SW-01-D-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0005 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.1067 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 0.235 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.2547 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:23 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:22 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 150 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 21:35 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-04

Date Collected: 05/30/18 13:20

Client ID: MP-RB-SW-02-MS/MSD-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0008 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.0977 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 0.184 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.2485 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:14 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:44 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 148 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 21:07 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-05

Date Collected: 05/30/18 14:15

Client ID: MP-RB-SW-03-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0006 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.1472 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 7.10 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.4564 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:25 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | 0.1880 | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:26 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 191 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 21:54 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-06

Date Collected: 05/30/18 14:40

Client ID: MP-RB-SW-04-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0006 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.1026 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 0.196 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.2583 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:27 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:30 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 144 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 21:59 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-07

Date Collected: 05/30/18 14:55

Client ID: MP-RB-SW-05-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|-----------------|----------------|----------------|-------------|-------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0016 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.0787 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 2.59 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.2408 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:28 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:34 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 111 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 22:03 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-08

Date Collected: 05/30/18 15:15

Client ID: MP-RB-SW-06-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.0889 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | 0.0011 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 8.07 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.1298 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:30 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | 0.0131 | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:38 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 129 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 22:08 | EPA 3005A | 1,6010C | AB |



Project Name: MCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**SAMPLE RESULTS**

Lab ID: L1819964-09

Date Collected: 05/30/18 16:00

Client ID: MP-UW-SW-01-053018

Date Received: 05/31/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Barium, Dissolved | 0.2876 | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Copper, Dissolved | 0.0014 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Iron, Dissolved | 31.8 | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Manganese, Dissolved | 0.4908 | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:36 | EPA 7470A | 97,7470A | EA |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 15:43 | EPA 3005A | 97,6020A | AM |
| Dissolved Hardness by SM 2340B - Mansfield Lab | | | | | | | | | | | |
| Hardness | 200 | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 22:13 | EPA 3005A | 1,6010C | AB |



Project Name: MCCLENNEN PARK

Lab Number: L1819964

Project Number: Not Specified

Report Date: 06/12/18

Method Blank Analysis Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab for sample(s): 01-09 Batch: WG1121634-1 | | | | | | | | | | |
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Barium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Iron, Dissolved | ND | | mg/l | 0.050 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Manganese, Dissolved | ND | | mg/l | 0.0010 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Selenium, Dissolved | ND | | mg/l | 0.005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | -- | 1 | 06/01/18 16:05 | 06/04/18 14:19 | 97,6020A | AM |

Prep Information

Digestion Method: EPA 3005A

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Dissolved Hardness by SM 2340B - Mansfield Lab for sample(s): 01-09 Batch: WG1121635-1 | | | | | | | | | | |
| Hardness | ND | | mg/l | 0.660 | NA | 1 | 06/01/18 16:05 | 06/11/18 20:58 | 1,6010C | AB |

Prep Information

Digestion Method: EPA 3005A

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|--------|-----|--------------------|------------------|------------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab for sample(s): 01-09 Batch: WG1121648-1 | | | | | | | | | | |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | -- | 1 | 06/01/18 16:46 | 06/04/18 18:04 | 97,7470A | EA |

Prep Information

Digestion Method: EPA 7470A



Lab Control Sample Analysis

Batch Quality Control

Project Name: MCLENNEN PARK

Project Number: Not Specified

Lab Number: L1819964

Report Date: 06/12/18

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|------------------|------|-------------------|------|---------------------|-----|------|------------|
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 Batch: WG1121634-2 WG1121634-3 | | | | | | | | |
| Arsenic, Dissolved | 106 | | 104 | | 80-120 | 2 | | 20 |
| Barium, Dissolved | 104 | | 102 | | 80-120 | 2 | | 20 |
| Cadmium, Dissolved | 106 | | 102 | | 80-120 | 4 | | 20 |
| Chromium, Dissolved | 107 | | 104 | | 80-120 | 3 | | 20 |
| Copper, Dissolved | 109 | | 106 | | 80-120 | 3 | | 20 |
| Iron, Dissolved | 113 | | 111 | | 80-120 | 2 | | 20 |
| Lead, Dissolved | 116 | | 114 | | 80-120 | 2 | | 20 |
| Manganese, Dissolved | 105 | | 101 | | 80-120 | 4 | | 20 |
| Selenium, Dissolved | 105 | | 101 | | 80-120 | 4 | | 20 |
| Silver, Dissolved | 101 | | 99 | | 80-120 | 2 | | 20 |
| Zinc, Dissolved | 108 | | 105 | | 80-120 | 3 | | 20 |
| Dissolved Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-09 Batch: WG1121635-2 | | | | | | | | |
| Hardness | 98 | | - | | 80-120 | - | | |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 Batch: WG1121648-2 WG1121648-3 | | | | | | | | |
| Mercury, Dissolved | 93 | | 94 | | 80-120 | 1 | | 20 |

Matrix Spike Analysis Batch Quality Control

Project Name: MCCLENNEN PARK

Project Number: Not Specified

Lab Number: L1819964

Report Date: 06/12/18

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121634-4 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0008 | 0.12 | 0.1302 | 108 | | - | - | | 75-125 | - | | 20 |
| Barium, Dissolved | 0.0977 | 2 | 2.142 | 102 | | - | - | | 75-125 | - | | 20 |
| Cadmium, Dissolved | ND | 0.051 | 0.0530 | 104 | | - | - | | 75-125 | - | | 20 |
| Chromium, Dissolved | ND | 0.2 | 0.2130 | 106 | | - | - | | 75-125 | - | | 20 |
| Copper, Dissolved | ND | 0.25 | 0.2730 | 109 | | - | - | | 75-125 | - | | 20 |
| Iron, Dissolved | 0.184 | 1 | 1.36 | 118 | | - | - | | 75-125 | - | | 20 |
| Lead, Dissolved | ND | 0.51 | 0.5912 | 116 | | - | - | | 75-125 | - | | 20 |
| Manganese, Dissolved | 0.2485 | 0.5 | 0.7770 | 106 | | - | - | | 75-125 | - | | 20 |
| Selenium, Dissolved | ND | 0.12 | 0.121 | 101 | | - | - | | 75-125 | - | | 20 |
| Silver, Dissolved | ND | 0.05 | 0.0492 | 98 | | - | - | | 75-125 | - | | 20 |
| Zinc, Dissolved | ND | 0.5 | 0.5718 | 114 | | - | - | | 75-125 | - | | 20 |
| Dissolved Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121635-3 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | | | | | | | |
| Hardness | 148 | 66.2 | 207 | 89 | | - | - | | 75-125 | - | | 20 |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121648-4 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | | | | | | | |
| Mercury, Dissolved | ND | 0.005 | 0.0044 | 89 | | - | - | | 75-125 | - | | 20 |

Lab Duplicate Analysis

Batch Quality Control

Project Name: MCCLENNEN PARK

Project Number: Not Specified

Lab Number: L1819964

Report Date: 06/12/18

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---------------|------------------|-------|-----|------|------------|
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121634-5 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | |
| Arsenic, Dissolved | 0.0008 | 0.0007 | mg/l | 11 | | 20 |
| Barium, Dissolved | 0.0977 | 0.1037 | mg/l | 6 | | 20 |
| Cadmium, Dissolved | ND | ND | mg/l | NC | | 20 |
| Chromium, Dissolved | ND | ND | mg/l | NC | | 20 |
| Copper, Dissolved | ND | ND | mg/l | NC | | 20 |
| Iron, Dissolved | 0.184 | 0.194 | mg/l | 5 | | 20 |
| Lead, Dissolved | ND | ND | mg/l | NC | | 20 |
| Manganese, Dissolved | 0.2485 | 0.2560 | mg/l | 3 | | 20 |
| Selenium, Dissolved | ND | ND | mg/l | NC | | 20 |
| Silver, Dissolved | ND | ND | mg/l | NC | | 20 |
| Zinc, Dissolved | ND | ND | mg/l | NC | | 20 |
| Dissolved Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121635-4 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | |
| Hardness | 148 | 150 | mg/l | 1 | | 20 |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121648-5 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | |
| Mercury, Dissolved | ND | ND | mg/l | NC | | 20 |

Project Name: MCCLENNEN PARK

Project Number: Not Specified

Lab Serial Dilution Analysis

Batch Quality Control

Lab Number: L1819964

Report Date: 06/12/18

| Parameter | Native Sample | Serial Dilution | Units | % D | Qual | RPD Limits |
|---|---------------|-----------------|-------|-----|------|------------|
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1121634-6 QC Sample: L1819964-04 Client ID: MP-RB-SW-02-MS/MSD-053018 | | | | | | |
| Barium, Dissolved | 0.0977 | 0.0996 | mg/l | 2 | | 10 |
| Manganese, Dissolved | 0.2485 | 0.2559 | mg/l | 3 | | 10 |

Project Name: MCCLENNEN PARK
Project Number: Not Specified

Serial_No:06121819:14
Lab Number: L1819964
Report Date: 06/12/18

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

| Cooler | Custody Seal |
|--------|--------------|
| A | Absent |

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------|--|--------|------------|----------|------------|------|--------|------------------|--|
| L1819964-01A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-01X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-02A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-02X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-03A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-03X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-04A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-04A1 | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-04A2 | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |

Project Name: MCLENNEN PARK
Project Number: Not Specified

Serial_No:06121819:14
Lab Number: L1819964
Report Date: 06/12/18

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------|--|--------|------------|----------|------------|------|--------|------------------|--|
| L1819964-04X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-04X1 | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-04X2 | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-05A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-05X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-06A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-06X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-07A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |

Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**Container Information**

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------------|--|---------------|-------------------|-----------------|-------------------|-------------|-------------|-------------------------|--|
| L1819964-07X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-08A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-08X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1819964-09A | Plastic 250ml unpreserved | A | 7 | 7 | 2.6 | Y | Absent | | - |
| L1819964-09X | Plastic 250ml HNO3 preserved Filtrates | A | NA | | 2.6 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),HARDS(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |

Project Name: MCCLENNEN PARK
Project Number: Not Specified

Lab Number: L1819964
Report Date: 06/12/18

GLOSSARY

Acronyms

| | |
|----------|---|
| EDL | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME). |
| EPA | - Environmental Protection Agency. |
| LCS | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| LCSD | - Laboratory Control Sample Duplicate: Refer to LCS. |
| LFB | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| MDL | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| MS | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. |
| MSD | - Matrix Spike Sample Duplicate: Refer to MS. |
| NA | - Not Applicable. |
| NC | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit. |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine. |
| NI | - Not Ignitable. |
| NP | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil. |
| RL | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| RPD | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report. |
| SRM | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples. |
| STLP | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315. |
| TIC | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations. |

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: Data Usability Report



Project Name: MCCLENNEN PARK**Lab Number:** L1819964**Project Number:** Not Specified**Report Date:** 06/12/18**Data Qualifiers**

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

Project Name: MCCLENNEN PARK
Project Number: Not Specified

Lab Number: L1819964
Report Date: 06/12/18

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624: m/p-xylene, o-xylene

EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

EPA 300: DW: Bromide

EPA 6860: SCM: Perchlorate

EPA 9010: NPW and SCM: Amenable Cyanide Distillation

SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **EPA 351.1, SM4500P-E, SM4500P-B, E,**

SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.

EPA 624: Volatile Halocarbons & Aromatics,

EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



8 Walkup Drive
Westboro, MA 01581
Tel: 508-896-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

CHAIN OF CUSTODY

PAGE 1 OF 1

Project Information

Project Name: **MCCLENNEN PARK**

Project Location: **ARLINGTON, MA**

Project #:

Project Manager: **JOSEPH FAMELY**

ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Date Rec'd in Lab: **5/31/18**

ALPHA Job #: **11819964**

Report Information - Data Deliverables

☐ ADEX ☒ EMAIL

Billing Information

☒ Same as Client info PO #: **2017-0069**

Regulatory Requirements & Project Information Requirements

☒ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods
☒ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics) (see note)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program Criteria

Client Information

Client: **WOODS HOLE GROUP**

Address: **81 TECHNOLOGY PARK DR
E. FALMOUTH, MA 02536**

Phone: **508-495-6220**

Email: **jfamily@whgrp.com**

Additional Project Information:

PER SUSAN CHAPNICK & LIZ PORTA:
RCRA 8 METALS, PLUS Cu, Fe, Mn, Zn
CALCULATE HARDNESS FROM DISSOLVED Ca & Mg

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection | | Sample Matrix | Sampler Initials |
|--------------------------------|--------------------------|------------|-------|------------------|---------------------|
| | | Date | Time | | |
| 19964-01 | MP-DO-SW-01-053018 | 5/30/18 | 11:55 | SW | DF |
| 02 | MP-RB-SW-01-053018 | 5/30/18 | 12:54 | SW | DF |
| 03 | MP-RB-SW-01-D-053018 | 5/30/18 | 12:56 | SW | DF |
| 04 | MP-RB-SW-02-MS/MD-053018 | 5/30/18 | 13:20 | SW | DF |
| 05 | MP-RB-SW-03-053018 | 5/30/18 | 14:15 | SW | DF |
| 06 | MP-RB-SW-04-053018 | 5/30/18 | 14:40 | SW | DF |
| 07 | MP-RB-SW-05-053018 | 5/30/18 | 14:55 | SW | DF |
| 08 | MP-RB-SW-06-053018 | 5/30/18 | 15:15 | SW | DF |
| 09 | MP-UW-SW-01-053018 | 5/30/18 | 16:00 | SW | DF |

| ANALYSIS | | | | | | | | | | SAMPLE INFO | |
|--|--|---|--|---|--|---|--|---|--|---|--|
| VOC: <input type="checkbox"/> 8260 <input type="checkbox"/> 824 <input type="checkbox"/> 524.2 | | SVOC: <input type="checkbox"/> ABN <input type="checkbox"/> PAH | | METALS: <input type="checkbox"/> MCP 13 <input type="checkbox"/> MCP 14 <input type="checkbox"/> RCP 15 | | EPH: <input type="checkbox"/> RCRA5 <input checked="" type="checkbox"/> RCRA6 <input type="checkbox"/> PP13 | | VPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only | | PCB <input type="checkbox"/> PEST | |
| TPH: <input type="checkbox"/> Quant Only <input type="checkbox"/> Fingerprint | | HARDNESS CALCULATION | | | | | | | | | |
| | | | | | | | | | | Filtration | |
| | | | | | | | | | | <input type="checkbox"/> Field | |
| | | | | | | | | | | <input checked="" type="checkbox"/> Lab to do | |
| | | | | | | | | | | Preservation | |
| | | | | | | | | | | <input type="checkbox"/> Lab to do | |
| | | | | | | | | | | Sample Comments | |

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative

A= None
B= HCl
C= HNO₃
D= H₂SO₄
E= NaOH
F= MeOH
G= NaHSO₄
H= Na₂S₂O₈
I= Ascorbic Acid
J= NH₄Cl
K= Zn Acetate
O= Other

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO. 01-01 (rev. 12-Mar-2012)



ANALYTICAL REPORT

| | |
|-----------------|---|
| Lab Number: | L1849652 |
| Client: | Woods Hole Group 107 Waterhouse Road Bourne, MA 02532 |
| ATTN: | Joseph Famely |
| Phone: | (508) 495-6220 |
| Project Name: | MCCLENNEN PARK |
| Project Number: | 2017-0069 |
| Report Date: | 12/28/18 |

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Alpha Sample ID | Client ID | Matrix | Sample Location | Collection Date/Time | Receive Date |
|-----------------|-----------------------|---------------|-----------------|----------------------|--------------|
| L1849652-01 | MP-RB-SW-01-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 08:25 | 12/05/18 |
| L1849652-02 | MP-RB-SW-02-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 08:40 | 12/05/18 |
| L1849652-03 | MP-RB-SW-03-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 08:55 | 12/05/18 |
| L1849652-04 | MP-RB-SW-07-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 09:10 | 12/05/18 |
| L1849652-05 | MP-RB-SW-07FD-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 09:12 | 12/05/18 |
| L1849652-06 | MP-RB-SW-04-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 09:25 | 12/05/18 |
| L1849652-07 | MP-RB-SW-05-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 09:35 | 12/05/18 |
| L1849652-08 | MP-RB-SW-06-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 09:50 | 12/05/18 |
| L1849652-09 | MP-RB-UW-01-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 11:05 | 12/05/18 |
| L1849652-10 | MP-RB-UW-02-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 11:20 | 12/05/18 |
| L1849652-11 | MP-RB-SW-08-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 10:13 | 12/05/18 |
| L1849652-12 | MP-RB-SW-08L-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 10:18 | 12/05/18 |
| L1849652-13 | MP-SW-EB-120418 | SURFACE WATER | ARLINGTON, MA | 12/04/18 11:05 | 12/05/18 |
| L1849652-14 | MP-RB-SED-08-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 10:22 | 12/05/18 |
| L1849652-15 | MP-RB-SED-03-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 10:30 | 12/05/18 |
| L1849652-16 | MP-RB-SED-07-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 12:30 | 12/05/18 |
| L1849652-17 | MP-RB-SED-07FD-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 12:50 | 12/05/18 |
| L1849652-18 | MP-RB-SED-04-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 13:10 | 12/05/18 |
| L1849652-19 | MP-RB-SED-05-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 13:30 | 12/05/18 |
| L1849652-20 | MP-RB-SED-06-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 13:50 | 12/05/18 |
| L1849652-21 | MP-UW-SED-02-120418 | SEDIMENT | ARLINGTON, MA | 12/04/18 14:50 | 12/05/18 |

Project Name: MCCLENNEN PARK

Lab Number: L1849652

Project Number: 2017-0069

Report Date: 12/28/18

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

| An affirmative response to questions A through F is required for "Presumptive Certainty" status | | |
|--|---|-----|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | YES |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | YES |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | YES |
| D | Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?" | YES |
| E a. | VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). | N/A |
| E b. | APH and TO-15 Methods only: Was the complete analyte list reported for each method? | N/A |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | YES |

| A response to questions G, H and I is required for "Presumptive Certainty" status | | |
|--|---|-----|
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)? | YES |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | NO |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | YES |

| |
|--|
| For any questions answered "No", please refer to the case narrative section on the following page(s). |
|--|

Please note that sample matrix information is located in the Sample Results section of this report.



Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

MCP Related Narratives

Total Metals

In reference to question H:

The WG1190565-3 MS recoveries, performed on L1849652-18, are outside the acceptance criteria for iron (2130%) and manganese (144%). Re-analysis of the MS yielded unacceptable recoveries for iron and manganese in the range of >125%. The LCS recoveries were within acceptance criteria for these analytes; therefore, no further action was taken.

The WG1190565-4 Laboratory Duplicate RPD for manganese (44%), performed on L1849652-18, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

Total Mercury

In reference to question H:

The WG1188095-4 MS recovery, performed on L1849652-18, is outside the acceptance criteria for mercury (170%). Re-analysis of the MS yielded unacceptable recoveries for mercury in the range of 30-74% or >125%. The LCS recovery was within acceptance criteria for this analyte; therefore, no further action was taken.

Dissolved Metals

In reference to question H:

The WG1190316-3 MS recovery, performed on L1849652-06, is outside the acceptance criteria for iron (130%). Re-analysis of the MS yielded unacceptable recoveries for iron in the range of >125%. The LCS recovery was within acceptance criteria for this analyte; therefore, no further action was taken.

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

Case Narrative (continued)

Non-MCP Related Narratives

Total Organic Carbon

The WG1188863-4 MS recovery for total organic carbon (rep2) (15%) performed on L1849652-18, is outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

Grain Size Analysis

The WG1186360-1 Laboratory Duplicate RPDs for % fine gravel (62%), % total gravel (62%) and % silt fine (26%), performed on L1849652-18, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Susan O'Neil

Title: Technical Director/Representative

Date: 12/28/18

METALS

Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-01

Date Collected: 12/04/18 08:25

Client ID: MP-RB-SW-01-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|-----|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 109 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 20:24 | EPA 3005A | 1,6010D | MC |
|----------|-----|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0690 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0012 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0024 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.80 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1872 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:17 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0172 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 16:53 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-02

Date Collected: 12/04/18 08:40

Client ID: MP-RB-SW-02-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 98.8 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 20:42 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0522 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0015 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0022 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.69 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1407 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:18 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0173 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 16:57 | EPA 3005A | 97,6020B | AM |



Project Name: MCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-03

Date Collected: 12/04/18 08:55

Client ID: MP-RB-SW-03-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
|-----------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------|----------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 81.6 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 20:47 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0508 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0021 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0020 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 2.00 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.0977 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:31 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0247 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:01 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-04

Date Collected: 12/04/18 09:10

Client ID: MP-RB-SW-07-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 95.2 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 20:51 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0548 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0017 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0020 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 2.00 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1374 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:33 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0182 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:05 | EPA 3005A | 97,6020B | AM |



Project Name: MCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-05

Date Collected: 12/04/18 09:12

Client ID: MP-RB-SW-07FD-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 95.0 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 20:56 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0536 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0015 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0018 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.79 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1351 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:35 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0185 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:10 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-06

Date Collected: 12/04/18 09:25

Client ID: MP-RB-SW-04-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 91.0 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:00 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0519 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0017 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0021 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.85 | | mg/l | 0.050 | 0.050 | 1 | 12/17/18 18:02 | 12/19/18 13:19 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1210 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:50 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0206 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 16:49 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-07

Date Collected: 12/04/18 09:35

Client ID: MP-RB-SW-05-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 88.2 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:32 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0460 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0016 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0019 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.72 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1073 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:36 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0104 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:14 | EPA 3005A | 97,6020B | AM |



Project Name: MCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-08

Date Collected: 12/04/18 09:50

Client ID: MP-RB-SW-06-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 97.2 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:37 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0554 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0026 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0021 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 4.63 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1044 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:38 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0205 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:18 | EPA 3005A | 97,6020B | AM |



Project Name: MCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-09

Date Collected: 12/04/18 11:05

Client ID: MP-RB-UW-01-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 62.4 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:41 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0941 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0074 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.91 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | 0.0018 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1946 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:40 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0948 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:22 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-10

Date Collected: 12/04/18 11:20

Client ID: MP-RB-UW-02-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------|----------------------|---------|
|-----------|--------|-----------|-------|----|-----|--------------------|------------------|------------------|----------------|----------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|-----|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 116 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:46 | EPA 3005A | 1,6010D | MC |
|----------|-----|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | 0.0009 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.1278 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | 0.0006 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0014 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0215 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 2.10 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | 0.0068 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.4381 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:42 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.3141 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:39 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-11

Date Collected: 12/04/18 10:13

Client ID: MP-RB-SW-08-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 91.9 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:51 | EPA 3005A | 1,6010D | MC |
|----------|------|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0518 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | 0.0018 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0017 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 1.91 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.1174 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:54 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0183 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:43 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-12

Date Collected: 12/04/18 10:18

Client ID: MP-RB-SW-08L-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|
|-----------|--------|-----------|-------|----|-----|-----------------|---------------|---------------|-------------|-------------------|---------|

Total Hardness by SM 2340B - Mansfield Lab

| | | | | | | | | | | | |
|----------|-----|--|------|-------|----|---|----------------|----------------|-----------|---------|----|
| Hardness | 132 | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 21:55 | EPA 3005A | 1,6010D | MC |
|----------|-----|--|------|-------|----|---|----------------|----------------|-----------|---------|----|

MCP Dissolved Metals - Mansfield Lab

| | | | | | | | | | | | |
|----------------------|--------|--|------|--------|--------|---|----------------|----------------|-----------|----------|----|
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | 0.0844 | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0011 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 8.98 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | 0.4888 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:55 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0563 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:47 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-13

Date Collected: 12/04/18 11:05

Client ID: MP-SW-EB-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Surface Water

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|--------|--------|-----------------|----------------|----------------|-------------|-------------------|---------|
| MCP Dissolved Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Barium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Copper, Dissolved | 0.0011 | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Iron, Dissolved | 0.071 | | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Manganese, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:57 | EPA 7470A | 97,7470A | MG |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |
| Zinc, Dissolved | 0.0212 | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 17:51 | EPA 3005A | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-14

Date Collected: 12/04/18 10:22

Client ID: MP-RB-SED-08-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 17%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|----------------------------------|--------|-----------|-------|-------|-------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 41.5 | | mg/kg | 2.79 | 2.79 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 228 | | mg/kg | 16.8 | 16.8 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | 2.050 | | mg/kg | 1.117 | 1.117 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 89.9 | | mg/kg | 11.2 | 11.2 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 101 | | mg/kg | 11.2 | 11.2 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 212000 | | mg/kg | 1120 | 1120 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 171 | | mg/kg | 3.35 | 3.35 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 807 | | mg/kg | 11.2 | 11.2 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.380 | 0.380 | 1 | 12/19/18 09:10 | 12/21/18 18:42 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 11.2 | 11.2 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 2.79 | 2.79 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 431 | | mg/kg | 55.8 | 55.8 | 10 | 12/18/18 11:40 | 12/20/18 15:26 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-15

Date Collected: 12/04/18 10:30

Client ID: MP-RB-SED-03-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 25%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 17.2 | | mg/kg | 1.99 | 1.99 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 121 | | mg/kg | 12.0 | 12.0 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | 1.206 | | mg/kg | 0.7972 | 0.7972 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 66.7 | | mg/kg | 7.97 | 7.97 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 72.3 | | mg/kg | 7.97 | 7.97 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 60100 | | mg/kg | 797 | 797. | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 111 | | mg/kg | 2.39 | 2.39 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 356 | | mg/kg | 7.97 | 7.97 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.260 | 0.260 | 1 | 12/19/18 09:10 | 12/21/18 18:44 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 7.97 | 7.97 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 1.99 | 1.99 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 358 | | mg/kg | 39.8 | 39.8 | 10 | 12/18/18 11:40 | 12/20/18 15:30 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-16

Date Collected: 12/04/18 12:30

Client ID: MP-RB-SED-07-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 22%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|----------------------------------|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 15.7 | | mg/kg | 2.18 | 2.18 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 78.0 | | mg/kg | 13.0 | 13.0 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | 1.237 | | mg/kg | 0.8702 | 0.8702 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 32.5 | | mg/kg | 8.70 | 8.70 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 48.0 | | mg/kg | 8.70 | 8.70 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 37800 | | mg/kg | 870 | 870. | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 114 | | mg/kg | 2.61 | 2.61 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 392 | | mg/kg | 8.70 | 8.70 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.289 | 0.289 | 1 | 12/19/18 09:10 | 12/21/18 18:45 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 8.70 | 8.70 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 2.18 | 2.18 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 484 | | mg/kg | 43.5 | 43.5 | 10 | 12/18/18 11:40 | 12/20/18 15:35 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-17

Date Collected: 12/04/18 12:50

Client ID: MP-RB-SED-07FD-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 20%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|----------------------------------|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 25.3 | | mg/kg | 2.38 | 2.38 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 121 | | mg/kg | 14.3 | 14.3 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | ND | | mg/kg | 0.9519 | 0.9519 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 51.3 | | mg/kg | 9.52 | 9.52 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 74.1 | | mg/kg | 9.52 | 9.52 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 57800 | | mg/kg | 952 | 952. | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 163 | | mg/kg | 2.86 | 2.86 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 671 | | mg/kg | 9.52 | 9.52 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.320 | 0.320 | 1 | 12/19/18 09:10 | 12/21/18 18:51 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 9.52 | 9.52 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 2.38 | 2.38 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 264 | | mg/kg | 47.6 | 47.6 | 10 | 12/18/18 11:40 | 12/20/18 15:44 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-18

Date Collected: 12/04/18 13:10

Client ID: MP-RB-SED-04-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 24%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|----------------------------------|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 11.7 | | mg/kg | 1.99 | 1.99 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 62.2 | | mg/kg | 11.9 | 11.9 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | ND | | mg/kg | 0.7952 | 0.7952 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 26.2 | | mg/kg | 7.95 | 7.95 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 39.9 | | mg/kg | 7.95 | 7.95 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 31000 | | mg/kg | 795 | 795. | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 159 | | mg/kg | 2.38 | 2.38 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 378 | | mg/kg | 7.95 | 7.95 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.262 | 0.262 | 1 | 12/19/18 09:10 | 12/21/18 18:34 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 7.95 | 7.95 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 1.99 | 1.99 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 185 | | mg/kg | 39.8 | 39.8 | 10 | 12/18/18 11:40 | 12/20/18 15:08 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-19

Date Collected: 12/04/18 13:30

Client ID: MP-RB-SED-05-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 21%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|----------------------------------|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 20.3 | | mg/kg | 2.35 | 2.35 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 136 | | mg/kg | 14.1 | 14.1 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | 0.9752 | | mg/kg | 0.9390 | 0.9390 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 56.5 | | mg/kg | 9.39 | 9.39 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 85.9 | | mg/kg | 9.39 | 9.39 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 46100 | | mg/kg | 939 | 939. | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 320 | | mg/kg | 2.82 | 2.82 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 454 | | mg/kg | 9.39 | 9.39 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.307 | 0.307 | 1 | 12/19/18 09:10 | 12/21/18 18:53 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 9.39 | 9.39 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 2.35 | 2.35 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 305 | | mg/kg | 47.0 | 47.0 | 10 | 12/18/18 11:40 | 12/20/18 17:56 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-20

Date Collected: 12/04/18 13:50

Client ID: MP-RB-SED-06-120418

Date Received: 12/05/18

Sample Location: ARLINGTON, MA

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 19%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|----------------------------------|--------|-----------|-------|-------|-------|--------------------|------------------|------------------|----------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 18.6 | | mg/kg | 2.56 | 2.56 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 142 | | mg/kg | 15.4 | 15.4 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | 1.131 | | mg/kg | 1.024 | 1.024 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 69.2 | | mg/kg | 10.2 | 10.2 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 74.5 | | mg/kg | 10.2 | 10.2 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 64200 | | mg/kg | 1020 | 1020 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 146 | | mg/kg | 3.07 | 3.07 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 422 | | mg/kg | 10.2 | 10.2 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | ND | | mg/kg | 0.345 | 0.345 | 1 | 12/19/18 09:10 | 12/21/18 18:55 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 10.2 | 10.2 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 2.56 | 2.56 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 356 | | mg/kg | 51.2 | 51.2 | 10 | 12/18/18 11:40 | 12/20/18 18:00 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**SAMPLE RESULTS**

Lab ID: L1849652-21
 Client ID: MP-UW-SED-02-120418
 Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 14:50
 Date Received: 12/05/18
 Field Prep: Not Specified

Sample Depth:
 Matrix: Sediment
 Percent Solids: 10%

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|--------|-----------|-------|-------|-------|-----------------|----------------|----------------|-------------|-------------------|---------|
| MCP Total Metals - Mansfield Lab | | | | | | | | | | | |
| Arsenic, Total | 6.28 | | mg/kg | 4.75 | 4.75 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Barium, Total | 345 | | mg/kg | 28.5 | 28.5 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Cadmium, Total | 3.802 | | mg/kg | 1.900 | 1.900 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Chromium, Total | 23.3 | | mg/kg | 19.0 | 19.0 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Copper, Total | 235 | | mg/kg | 19.0 | 19.0 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Iron, Total | 72800 | | mg/kg | 1900 | 1900 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Lead, Total | 472 | | mg/kg | 5.70 | 5.70 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Manganese, Total | 186 | | mg/kg | 19.0 | 19.0 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Mercury, Total | 0.681 | | mg/kg | 0.630 | 0.630 | 1 | 12/19/18 09:10 | 12/21/18 18:56 | EPA 7471B | 97,7471B | EA |
| Selenium, Total | ND | | mg/kg | 19.0 | 19.0 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 4.75 | 4.75 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |
| Zinc, Total | 785 | | mg/kg | 95.0 | 95.0 | 10 | 12/18/18 11:40 | 12/20/18 18:05 | EPA 3050B | 97,6020B | AM |



Project Name: MCCLENNEN PARK

Lab Number: L1849652

Project Number: 2017-0069

Report Date: 12/28/18

Method Blank Analysis Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|-------|-------|--------------------|------------------|------------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab for sample(s): 14-21 Batch: WG1188095-1 | | | | | | | | | | |
| Mercury, Total | ND | | mg/kg | 0.083 | 0.083 | 1 | 12/19/18 09:10 | 12/21/18 18:29 | 97,7471B | EA |

Prep Information

Digestion Method: EPA 7471B

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab for sample(s): 01-13 Batch: WG1188563-1 | | | | | | | | | | |
| Mercury, Dissolved | ND | | mg/l | 0.0002 | 0.0002 | 1 | 12/12/18 14:51 | 12/13/18 22:03 | 97,7470A | MG |

Prep Information

Digestion Method: EPA 7470A

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------------|---------|
| MCP Dissolved Metals - Mansfield Lab for sample(s): 01-13 Batch: WG1190316-1 | | | | | | | | | | |
| Arsenic, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Barium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Cadmium, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Chromium, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Copper, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Iron, Dissolved | 0.059 | J | mg/l | 0.065 | 0.050 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Lead, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Manganese, Dissolved | ND | | mg/l | 0.0010 | 0.0010 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Selenium, Dissolved | ND | | mg/l | 0.005 | 0.005 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Silver, Dissolved | ND | | mg/l | 0.0005 | 0.0005 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |
| Zinc, Dissolved | ND | | mg/l | 0.0100 | 0.0100 | 1 | 12/17/18 18:02 | 12/18/18 15:59 | 97,6020B | AM |

Prep Information

Digestion Method: EPA 3005A



Project Name: MCCLENNEN PARK

Lab Number: L1849652

Project Number: 2017-0069

Report Date: 12/28/18

Method Blank Analysis Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|--------|--------|--------------------|------------------|------------------|----------------------|---------|
| MCP Total Metals - Mansfield Lab for sample(s): 14-21 Batch: WG1190565-1 | | | | | | | | | | |
| Arsenic, Total | ND | | mg/kg | 0.625 | 0.625 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Barium, Total | ND | | mg/kg | 3.75 | 3.75 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Cadmium, Total | ND | | mg/kg | 0.2500 | 0.2500 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Chromium, Total | ND | | mg/kg | 2.50 | 2.50 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Copper, Total | ND | | mg/kg | 2.50 | 2.50 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Iron, Total | ND | | mg/kg | 250 | 250. | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Lead, Total | ND | | mg/kg | 0.750 | 0.750 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Manganese, Total | ND | | mg/kg | 2.50 | 2.50 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Selenium, Total | ND | | mg/kg | 2.50 | 2.50 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Silver, Total | ND | | mg/kg | 0.625 | 0.625 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |
| Zinc, Total | ND | | mg/kg | 12.5 | 12.5 | 10 | 12/18/18 11:40 | 12/20/18 14:11 | 97,6020B | AM |

Prep Information

Digestion Method: EPA 3050B

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|-------|-----|--------------------|------------------|------------------|----------------------|---------|
| Total Hardness by SM 2340B - Mansfield Lab for sample(s): 01-12 Batch: WG1190797-1 | | | | | | | | | | |
| Hardness | ND | | mg/l | 0.660 | NA | 1 | 12/18/18 19:23 | 12/27/18 19:30 | 1,6010D | MC |

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis Batch Quality Control

Project Name: MCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|--|------------------|------|-------------------|------|---------------------|-----|------|------------|
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 Batch: WG1188095-2 WG1188095-3 SRM Lot Number: D102-540 | | | | | | | | |
| Mercury, Total | 123 | | 130 | | 65-134 | 6 | | 30 |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-13 Batch: WG1188563-2 WG1188563-3 | | | | | | | | |
| Mercury, Dissolved | 92 | | 98 | | 80-120 | 6 | | 20 |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-13 Batch: WG1190316-6 WG1190316-7 | | | | | | | | |
| Arsenic, Dissolved | 100 | | 103 | | 80-120 | 3 | | 20 |
| Barium, Dissolved | 104 | | 108 | | 80-120 | 4 | | 20 |
| Cadmium, Dissolved | 100 | | 110 | | 80-120 | 10 | | 20 |
| Chromium, Dissolved | 101 | | 105 | | 80-120 | 4 | | 20 |
| Copper, Dissolved | 98 | | 106 | | 80-120 | 8 | | 20 |
| Iron, Dissolved | 107 | | 117 | | 80-120 | 9 | | 20 |
| Lead, Dissolved | 97 | | 101 | | 80-120 | 4 | | 20 |
| Manganese, Dissolved | 100 | | 105 | | 80-120 | 5 | | 20 |
| Selenium, Dissolved | 102 | | 105 | | 80-120 | 3 | | 20 |
| Silver, Dissolved | 104 | | 108 | | 80-120 | 4 | | 20 |
| Zinc, Dissolved | 106 | | 112 | | 80-120 | 6 | | 20 |

Lab Control Sample Analysis Batch Quality Control

Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Parameter | LCS %Recovery | LCSD %Recovery | %Recovery Limits | RPD | RPD Limits |
|--|------------------|-------------------|---------------------|-----|------------|
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 Batch: WG1190565-6 WG1190565-7 SRM Lot Number: D102-540 | | | | | |
| Arsenic, Total | 109 | 110 | 83-117 | 1 | 30 |
| Barium, Total | 109 | 111 | 83-118 | 2 | 30 |
| Cadmium, Total | 112 | 115 | 83-118 | 3 | 30 |
| Chromium, Total | 102 | 102 | 83-117 | 0 | 30 |
| Copper, Total | 108 | 106 | 84-116 | 2 | 30 |
| Iron, Total | 96 | 98 | 61-139 | 2 | 30 |
| Lead, Total | 107 | 110 | 82-118 | 3 | 30 |
| Manganese, Total | 102 | 102 | 82-118 | 0 | 30 |
| Selenium, Total | 111 | 114 | 79-121 | 3 | 30 |
| Silver, Total | 115 | 115 | 80-120 | 0 | 30 |
| Zinc, Total | 105 | 106 | 81-118 | 1 | 30 |
| Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-12 Batch: WG1190797-2 | | | | | |
| Hardness | 106 | - | 80-120 | - | |

Matrix Spike Analysis

Batch Quality Control

Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|--|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1188095-4 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | | | | | | | |
| Mercury, Total | ND | 0.523 | 0.890 | 170 | Q | - | - | | 75-125 | - | | 35 |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-13 QC Batch ID: WG1188563-4 WG1188563-5 QC Sample: L1849652-06 Client ID: MP-RB-SW-04-120418 | | | | | | | | | | | | |
| Mercury, Dissolved | ND | 0.005 | 0.0043 | 86 | | 0.0039 | 79 | | 75-125 | 9 | | 20 |
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-13 QC Batch ID: WG1190316-3 WG1190316-4 QC Sample: L1849652-06 Client ID: MP-RB-SW-04-120418 | | | | | | | | | | | | |
| Arsenic, Dissolved | ND | 0.12 | 0.1211 | 101 | | 0.1245 | 104 | | 75-125 | 3 | | 20 |
| Barium, Dissolved | 0.0519 | 2 | 2.082 | 102 | | 2.225 | 109 | | 75-125 | 7 | | 20 |
| Cadmium, Dissolved | ND | 0.051 | 0.0559 | 110 | | 0.0577 | 113 | | 75-125 | 3 | | 20 |
| Chromium, Dissolved | 0.0017 | 0.2 | 0.1980 | 98 | | 0.2088 | 104 | | 75-125 | 5 | | 20 |
| Copper, Dissolved | 0.0021 | 0.25 | 0.2464 | 98 | | 0.2686 | 107 | | 75-125 | 9 | | 20 |
| Iron, Dissolved | 1.85 | 1 | 3.15 | 130 | Q | 3.01 | 116 | | 75-125 | 5 | | 20 |
| Lead, Dissolved | ND | 0.51 | 0.4981 | 98 | | 0.5217 | 102 | | 75-125 | 5 | | 20 |
| Manganese, Dissolved | 0.1210 | 0.5 | 0.6041 | 97 | | 0.6329 | 102 | | 75-125 | 5 | | 20 |
| Selenium, Dissolved | ND | 0.12 | 0.114 | 95 | | 0.130 | 108 | | 75-125 | 13 | | 20 |
| Silver, Dissolved | ND | 0.05 | 0.0518 | 104 | | 0.0561 | 112 | | 75-125 | 8 | | 20 |
| Zinc, Dissolved | 0.0206 | 0.5 | 0.5419 | 104 | | 0.5734 | 110 | | 75-125 | 6 | | 20 |

Matrix Spike Analysis Batch Quality Control

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | MSD Found | MSD %Recovery | Recovery Limits | RPD | RPD Limits |
|--|---------------|----------|----------|--------------|-----------|---------------|-----------------|-----|------------|
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1190565-3 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | | | | |
| Arsenic, Total | 11.7 | 39.4 | 53.3 | 106 | - | - | 75-125 | - | 35 |
| Barium, Total | 62.2 | 656 | 747 | 104 | - | - | 75-125 | - | 35 |
| Cadmium, Total | ND | 16.7 | 18.18 | 109 | - | - | 75-125 | - | 35 |
| Chromium, Total | 26.2 | 65.6 | 97.0 | 108 | - | - | 75-125 | - | 35 |
| Copper, Total | 39.9 | 82 | 130 | 110 | - | - | 75-125 | - | 35 |
| Iron, Total | 31000 | 328 | 38000 | 2130 | Q | - | 75-125 | - | 35 |
| Lead, Total | 159 | 167 | 350 | 114 | - | - | 75-125 | - | 35 |
| Manganese, Total | 378 | 164 | 614 | 144 | Q | - | 75-125 | - | 35 |
| Selenium, Total | ND | 39.4 | 38.1 | 97 | - | - | 75-125 | - | 35 |
| Silver, Total | ND | 98.4 | 109 | 111 | - | - | 75-125 | - | 35 |
| Zinc, Total | 185 | 164 | 372 | 114 | - | - | 75-125 | - | 35 |
| Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1190797-3 QC Sample: L1849652-01 Client ID: MP-RB-SW-01-120418 | | | | | | | | | |
| Hardness | 109 | 66.2 | 178 | 104 | - | - | 75-125 | - | 20 |

Lab Duplicate Analysis

Batch Quality Control

Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|--|---------------|------------------|-------|-----|------|------------|
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1188095-5 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | |
| Mercury, Total | ND | ND | mg/kg | NC | | 35 |
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1190565-4 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | |
| Arsenic, Total | 11.7 | 16.4 | mg/kg | 33 | | 35 |
| Barium, Total | 62.2 | 88.7 | mg/kg | 35 | | 35 |
| Cadmium, Total | ND | ND | mg/kg | NC | | 35 |
| Chromium, Total | 26.2 | 37.2 | mg/kg | 35 | | 35 |
| Copper, Total | 39.9 | 49.7 | mg/kg | 22 | | 35 |
| Iron, Total | 31000 | 44300 | mg/kg | 35 | | 35 |
| Lead, Total | 159 | 188 | mg/kg | 17 | | 35 |
| Manganese, Total | 378 | 592 | mg/kg | 44 | Q | 35 |
| Selenium, Total | ND | ND | mg/kg | NC | | 35 |
| Silver, Total | ND | ND | mg/kg | NC | | 35 |
| Zinc, Total | 185 | 228 | mg/kg | 21 | | 35 |
| Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1190797-4 QC Sample: L1849652-01 Client ID: MP-RB-SW-01-120418 | | | | | | |
| Hardness | 109 | 111 | mg/l | 2 | | 20 |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

**Lab Serial Dilution
Analysis
Batch Quality Control**

Lab Number: L1849652
Report Date: 12/28/18

| Parameter | Native Sample | Serial Dilution | Units | % D | Qual | RPD Limits |
|--|---------------|-----------------|-------|-----|------|------------|
| MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-13 QC Batch ID: WG1190316-5 QC Sample: L1849652-06 Client ID: MP-RB-SW-04-120418 | | | | | | |
| Iron, Dissolved | 1.85 | 1.98 | mg/l | 7 | | 20 |
| MCP Total Metals - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1190565-5 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | |
| Iron, Total | 31000 | 31100 | mg/kg | 0 | | 20 |
| Lead, Total | 159 | 160 | mg/kg | 1 | | 20 |
| Manganese, Total | 378 | 372 | mg/kg | 2 | | 20 |

INORGANICS & MISCELLANEOUS

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-14
Client ID: MP-RB-SED-08-120418
Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 10:22
Date Received: 12/05/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 10.3 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 12:38 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 10.1 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 12:38 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 5.00 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 28.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 13.4 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 47.3 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 35.6 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 17.1 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 52.7 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 16.7 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-15

Client ID: MP-RB-SED-03-120418

Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 10:30

Date Received: 12/05/18

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 11.8 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 12:48 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 11.2 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 12:48 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 0.700 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 0.700 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 4.80 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 20.8 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 32.8 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 58.4 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 32.6 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 8.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 40.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 24.5 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-16

Client ID: MP-RB-SED-07-120418

Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 12:30

Date Received: 12/05/18

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 4.75 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 12:59 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 4.83 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 12:59 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 1.60 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 1.60 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 18.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 38.2 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 28.7 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 85.8 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 9.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 3.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 12.6 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 22.1 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-17
 Client ID: MP-RB-SED-07FD-120418
 Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 12:50
 Date Received: 12/05/18
 Field Prep: Not Specified

Sample Depth:
 Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.78 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 13:10 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 4.29 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 13:10 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 6.80 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 6.80 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 12.2 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 29.4 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 32.1 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 73.7 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 16.1 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 3.40 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 19.5 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 19.6 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-18

Client ID: MP-RB-SED-04-120418

Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 13:10

Date Received: 12/05/18

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.47 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 13:20 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 4.24 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 13:20 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 0.900 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 0.900 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 4.50 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 28.0 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 51.1 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 83.6 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 11.2 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 4.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 15.5 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 24.0 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-19

Client ID: MP-RB-SED-05-120418

Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 13:30

Date Received: 12/05/18

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 4.27 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 14:03 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 5.56 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 14:03 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 19.2 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 19.2 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 11.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 22.3 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 23.7 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 57.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 15.6 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 7.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 22.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 20.8 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-20

Client ID: MP-RB-SED-06-120418

Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 13:50

Date Received: 12/05/18

Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 6.26 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 14:14 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 7.82 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 14:14 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 0.300 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 0.300 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 4.10 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 21.6 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 34.2 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 59.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 31.4 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 8.40 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 39.8 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 18.5 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

SAMPLE RESULTS

Lab ID: L1849652-21
 Client ID: MP-UW-SED-02-120418
 Sample Location: ARLINGTON, MA

Date Collected: 12/04/18 14:50
 Date Received: 12/05/18
 Field Prep: Not Specified

Sample Depth:
 Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--------------------------------------|--------|-----------|-------|-------|-------|-----------------|---------------|----------------|-------------------|---------|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 31.8 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 14:25 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | 31.9 | | % | 0.010 | 0.010 | 1 | - | 12/12/18 14:25 | 1,9060A | SP |
| Grain Size Analysis - Mansfield Lab | | | | | | | | | | |
| Cobbles | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Gravel | ND | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Gravel | 3.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Gravel | 3.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Coarse Sand | 14.3 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Medium Sand | 42.4 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Fine Sand | 26.1 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Sand | 82.8 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Silt Fine | 5.60 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Clay Fine | 8.30 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| % Total Fines | 13.9 | | % | 0.100 | NA | 1 | - | 12/06/18 11:12 | 12,D6913/D7928 | GD |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 9.97 | | % | 0.100 | 0.100 | 1 | - | 12/06/18 12:43 | 121,2540G | GD |



Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**Method Blank Analysis**
Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|--|--------|-----------|-------|-------|-------|--------------------|------------------|------------------|----------------------|---------|
| Total Organic Carbon - Mansfield Lab for sample(s): 14-21 Batch: WG1188863-1 | | | | | | | | | | |
| Total Organic Carbon (Rep1) | ND | | % | 0.010 | 0.010 | 1 | - | 12/12/18 09:23 | 1,9060A | SP |
| Total Organic Carbon (Rep2) | ND | | % | 0.010 | 0.010 | 1 | - | 12/12/18 09:23 | 1,9060A | SP |

Lab Control Sample Analysis Batch Quality Control

Project Name: MCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|------------------|------|-------------------|------|---------------------|-----|------|------------|
| Total Organic Carbon - Mansfield Lab Associated sample(s): 14-21 Batch: WG1188863-2 | | | | | | | | |
| Total Organic Carbon (Rep1) | 103 | | - | | 75-125 | - | | 25 |
| Total Organic Carbon (Rep2) | 98 | | - | | 75-125 | - | | 25 |

Matrix Spike Analysis Batch Quality Control

Project Name: MCCLENNEN PARK

Lab Number: L1849652

Project Number: 2017-0069

Report Date: 12/28/18

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---------------|----------|----------|--------------|------|-----------|---------------|------|-----------------|-----|------|------------|
| Total Organic Carbon - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1188863-4 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.47 | 0.807 | 4.13 | 82 | | - | - | | 75-125 | - | | 25 |
| Total Organic Carbon (Rep2) | 4.24 | 1.08 | 4.40 | 15 | Q | - | - | | 75-125 | - | | 25 |

Lab Duplicate Analysis *Batch Quality Control*

Project Name: MCCLENNEN PARK

Project Number: 2017-0069

Lab Number: L1849652

Report Date: 12/28/18

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---------------|------------------|-------|-----|------|------------|
| Grain Size Analysis - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1186360-1 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | |
| Cobbles | ND | ND | % | NC | | 20 |
| % Coarse Gravel | ND | ND | % | NC | | 20 |
| % Fine Gravel | 0.900 | 1.70 | % | 62 | Q | 20 |
| % Total Gravel | 0.900 | 1.70 | % | 62 | Q | 20 |
| % Coarse Sand | 4.50 | 4.60 | % | 2 | | 20 |
| % Medium Sand | 28.0 | 23.5 | % | 17 | | 20 |
| % Fine Sand | 51.1 | 51.5 | % | 1 | | 20 |
| % Total Sand | 83.6 | 79.6 | % | 5 | | 20 |
| % Silt Fine | 11.2 | 14.5 | % | 26 | Q | 20 |
| % Clay Fine | 4.30 | 4.20 | % | 2 | | 20 |
| % Total Fines | 15.5 | 18.7 | % | 19 | | 20 |
| General Chemistry - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1186363-1 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | |
| Solids, Total | 24.0 | 25.6 | % | 6 | | 10 |
| Total Organic Carbon - Mansfield Lab Associated sample(s): 14-21 QC Batch ID: WG1188863-3 QC Sample: L1849652-18 Client ID: MP-RB-SED-04-120418 | | | | | | |
| Total Organic Carbon (Rep1) | 3.47 | 3.51 | % | 1 | | 25 |
| Total Organic Carbon (Rep2) | 4.24 | 4.18 | % | 1 | | 25 |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Serial_No: 12281813:58
Lab Number: L1849652
Report Date: 12/28/18

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

| Cooler | Custody Seal |
|--------|--------------|
| A | Absent |
| B | Absent |

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|--------------|--|--------|------------|----------|------------|------|--------|------------------|---|
| L1849652-01A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-01B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-01X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-02A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-02B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-02X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-03A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-03B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-03X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-04A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-04B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Serial_No: 12281813:58
Lab Number: L1849652
Report Date: 12/28/18

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------|--|--------|------------|----------|------------|------|--------|------------------|---|
| L1849652-04X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-05A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-05B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-05X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-06A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-06A1 | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-06A2 | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-06B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-06X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-06X1 | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-06X2 | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-07A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-07B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |

Project Name: MCCLENNEN PARK**Lab Number:** L1849652**Project Number:** 2017-0069**Report Date:** 12/28/18**Container Information**

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------------|--|---------------|-------------------|-----------------|-------------------|-------------|-------------|-------------------------|---|
| L1849652-07X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-08A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-08B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-08X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-09A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-09B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-09X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-10A | Plastic 250ml unpreserved | A | 7 | 7 | 4.9 | Y | Absent | | - |
| L1849652-10B | Plastic 250ml HNO3 preserved | A | <2 | <2 | 4.9 | Y | Absent | | HARDT(180) |
| L1849652-10X | Plastic 120ml HNO3 preserved Filtrates | A | NA | | 4.9 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-11A | Plastic 250ml unpreserved | B | 7 | 7 | 4.1 | Y | Absent | | - |
| L1849652-11B | Plastic 250ml HNO3 preserved | B | <2 | <2 | 4.1 | Y | Absent | | HARDT(180) |
| L1849652-11X | Plastic 120ml HNO3 preserved Filtrates | B | NA | | 4.1 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-12A | Plastic 250ml unpreserved | B | 7 | 7 | 4.1 | Y | Absent | | - |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Serial_No: 12281813:58
Lab Number: L1849652
Report Date: 12/28/18

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|--------------|--|--------|------------|----------|------------|------|--------|------------------|--|
| L1849652-12B | Plastic 250ml HNO3 preserved | B | <2 | <2 | 4.1 | Y | Absent | | HARDT(180) |
| L1849652-12X | Plastic 120ml HNO3 preserved Filtrates | B | NA | | 4.1 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-13A | Plastic 250ml unpreserved | B | 7 | 7 | 4.1 | Y | Absent | | - |
| L1849652-13X | Plastic 120ml HNO3 preserved Filtrates | B | NA | | 4.1 | Y | Absent | | MCP-PB-6020S-10(180),MCP-7470S-10(28),MCP-CU-6020S-10(180),MCP-FE-6020S-10(180),MCP-BA-6020S-10(180),MCP-CD-6020S-10(180),MCP-MN-6020S-10(180),MCP-SE-6020S-10(180),MCP-AS-6020S-10(180),MCP-AG-6020S-10(180),MCP-ZN-6020S-10(180),MCP-CR-6020S-10(180) |
| L1849652-14A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLES(),A2-HYDRO-FGRAVEL() |
| L1849652-14B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |
| L1849652-15A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLES(),A2-HYDRO-FGRAVEL() |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Serial_No: 12281813:58
Lab Number: L1849652
Report Date: 12/28/18

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|--------------|--|--------|------------|----------|------------|------|--------|------------------|--|
| L1849652-15B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |
| L1849652-16A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLER(),A2-HYDRO-FGRAVEL() |
| L1849652-16B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |
| L1849652-17A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLER(),A2-HYDRO-FGRAVEL() |
| L1849652-17B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |
| L1849652-18A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLER(),A2-HYDRO-FGRAVEL() |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Serial_No: 12281813:58
Lab Number: L1849652
Report Date: 12/28/18

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---------------|--|--------|------------|----------|------------|------|--------|------------------|--|
| L1849652-18B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |
| L1849652-18B1 | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-PREP-3050:1T(180) |
| L1849652-18B2 | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-PREP-3050:1T(180) |
| L1849652-19A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLER(),A2-HYDRO-FGRAVEL() |
| L1849652-19B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |

Project Name: MCLENNEN PARK
Project Number: 2017-0069

Serial_No: 12281813:58
Lab Number: L1849652
Report Date: 12/28/18

Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|--------------|--|--------|------------|----------|------------|------|--------|------------------|--|
| L1849652-20A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLER(),A2-HYDRO-FGRAVEL() |
| L1849652-20B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |
| L1849652-21A | Plastic 8oz unpreserved for Grain Size | B | NA | | 4.1 | Y | Absent | | A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLER(),A2-HYDRO-FGRAVEL() |
| L1849652-21B | Glass 250ml/8oz unpreserved | B | NA | | 4.1 | Y | Absent | | A2-BA-MCP6020T-10(180),A2-CR-MCP6020T-10(180),A2-AG-MCP6020T-10(180),A2-AS-MCP6020T-10(180),A2-CD-MCP6020T-10(180),A2-MN-MCP6020T-10(180),A2-TS(7),A2-ZN-MCP6020T-10(180),A2-FE-MCP6020T-10(180),A2-CU-MCP6020T-10(180),A2-HG-MCP7471T-10(28),A2-SE-MCP6020T-10(180),A2-HGPREP-AA(28),A2-PB-MCP6020T-10(180),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-PREP-3050:1T(180) |

Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

GLOSSARY

Acronyms

| | |
|----------|---|
| EDL | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME). |
| EMPC | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration. |
| EPA | - Environmental Protection Agency. |
| LCS | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| LCSD | - Laboratory Control Sample Duplicate: Refer to LCS. |
| LFB | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| MDL | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| MS | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. |
| MSD | - Matrix Spike Sample Duplicate: Refer to MS. |
| NA | - Not Applicable. |
| NC | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit. |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine. |
| NI | - Not Ignitable. |
| NP | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil. |
| RL | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| RPD | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report. |
| SRM | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples. |
| STLP | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315. |
| TEF | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD. |
| TEQ | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values. |
| TIC | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations. |

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers



Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers



Project Name: MCCLENNEN PARK
Project Number: 2017-0069

Lab Number: L1849652
Report Date: 12/28/18

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.
- 97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

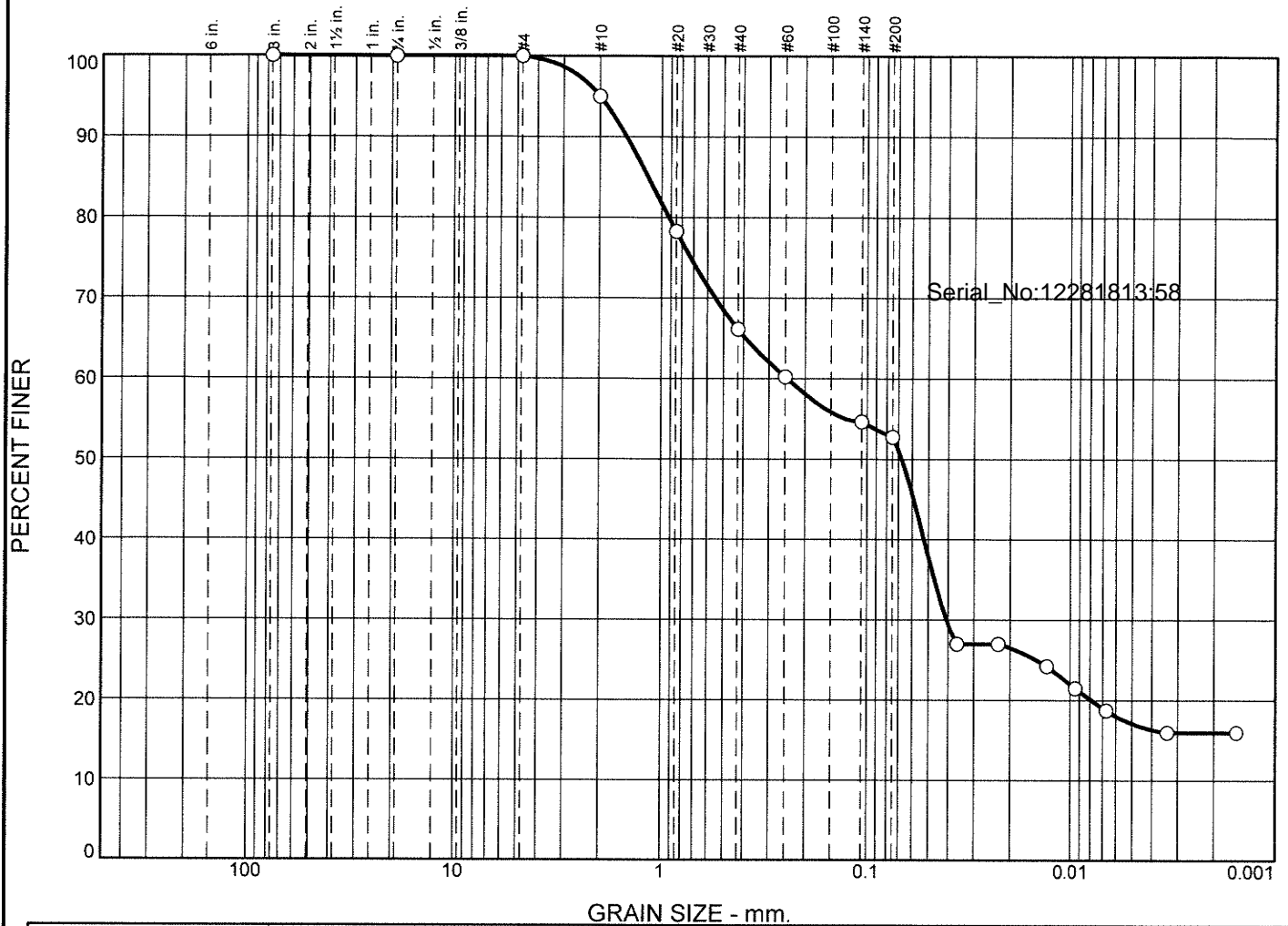


Serial_No:12281813:58

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | | | | | | | |
|------------------|----------|----------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|--|------|--|------|--|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | | | | | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | | | | | | | |
| ○ | 0.0 | | 0.0 | | 0.0 | | 5.0 | | 28.9 | | 13.4 | | 35.6 | | 17.1 | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| × | Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u | | | | | |
| ○ | | | | 1.1632 | 0.2449 | 0.0675 | 0.0408 | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| Material Description | | | | | | | | USCS | AASHTO |
|----------------------|--|--|--|--|--|--|--|------|--------|
| | | | | | | | | | |

| | | |
|---|---|--------------------------------------|
| Project No. Project: ○ Source of Sample: MP-RB-SED-08-120418 Sample Number: L1849652-14 Date: ○ | Client: Alpha Analytical Mansfield, MA | Remarks: Figure |
|---|---|--------------------------------------|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-08-120418

Sample Number: L1849652-14

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 8.97
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 8.97 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.00 | 0.00 | 100.0 |
| | | #10 | 0.45 | 0.00 | 95.0 |
| | | #20 | 1.50 | 0.00 | 78.3 |
| | | #40 | 1.09 | 0.00 | 66.1 |
| | | #60 | 0.53 | 0.00 | 60.2 |
| | | #140 | 0.50 | 0.00 | 54.6 |
| | | #200 | 0.17 | 0.00 | 52.7 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 52.7
Weight of hydrometer sample = 15.35
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0045 | 1.0049 | 0.0132 | 4.5 | 15.1 | 0.0362 | 27.0 |
| 5.00 | 22.9 | 1.0045 | 1.0049 | 0.0132 | 4.5 | 15.1 | 0.0229 | 27.0 |
| 15.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0133 | 24.2 |
| 30.00 | 22.9 | 1.0035 | 1.0039 | 0.0132 | 3.5 | 15.4 | 0.0094 | 21.5 |
| 60.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0067 | 18.7 |
| 240.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0034 | 16.0 |
| 1140.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0015 | 16.0 |

Fractional Components

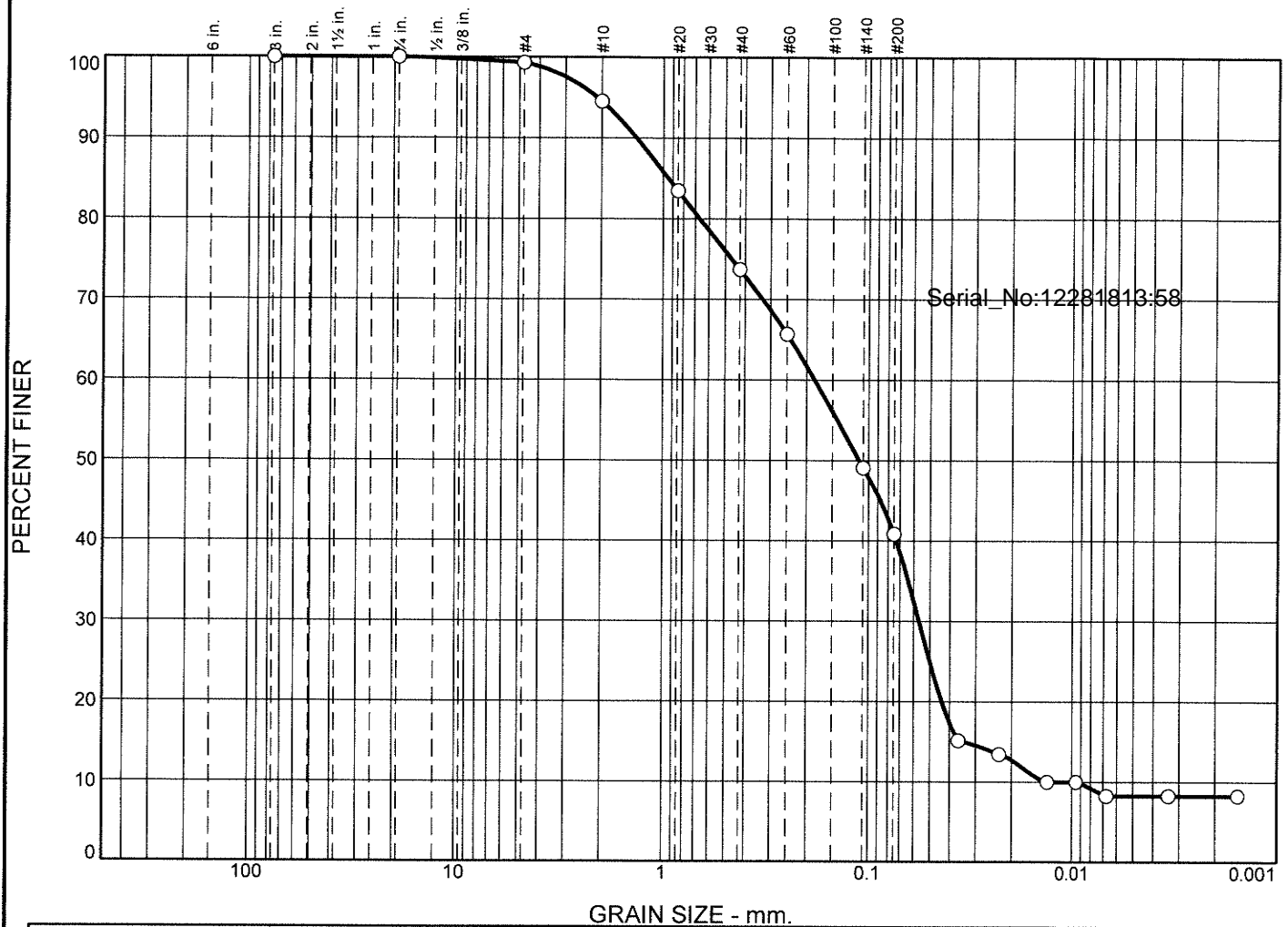
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 28.9 | 13.4 | 47.3 | 35.6 | 17.1 | 52.7 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | 0.0079 | 0.0408 | 0.0525 | 0.0675 | 0.2449 | 0.9228 | 1.1632 | 1.4834 | 2.0025 |

| Fineness Modulus |
|------------------|
| 1.28 |

Alpha Analytical

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | | |
|-------------------------------------|----------|----------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | | |
| <input type="radio"/> | 0.0 | 0.0 | 0.7 | 4.8 | 20.8 | 32.8 | 32.6 | | 8.3 | | |
| <input checked="" type="checkbox"/> | Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| <input type="radio"/> | | | | 0.9464 | 0.1829 | 0.1109 | 0.0566 | 0.0345 | 0.0136 | 1.29 | 13.48 |

| Material Description | USCS | AASHTO |
|-----------------------|------|--------|
| <input type="radio"/> | | |

| | | |
|---|---|--|
| Project No. Project: <input type="radio"/> Source of Sample: MP-RB-SED-03-120418 Sample Number: L1849652-15 Date: <input type="radio"/> | Client: Alpha Analytical Mansfield, MA | Remarks: Figure |
|---|---|--|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-03-120418

Sample Number: L1849652-15

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.41

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 19.41 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.13 | 0.00 | 99.3 |
| | | #10 | 0.93 | 0.00 | 94.5 |
| | | #20 | 2.15 | 0.00 | 83.5 |
| | | #40 | 1.89 | 0.00 | 73.7 |
| | | #60 | 1.56 | 0.00 | 65.7 |
| | | #140 | 3.22 | 0.00 | 49.1 |
| | | #200 | 1.60 | 0.00 | 40.9 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 40.9

Weight of hydrometer sample = 19.04

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0363 | 15.1 |
| 5.00 | 22.9 | 1.0035 | 1.0039 | 0.0132 | 3.5 | 15.4 | 0.0231 | 13.4 |
| 15.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0134 | 10.0 |
| 30.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0095 | 10.0 |
| 60.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0068 | 8.3 |
| 240.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0034 | 8.3 |
| 1140.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0015 | 8.3 |

Fractional Components

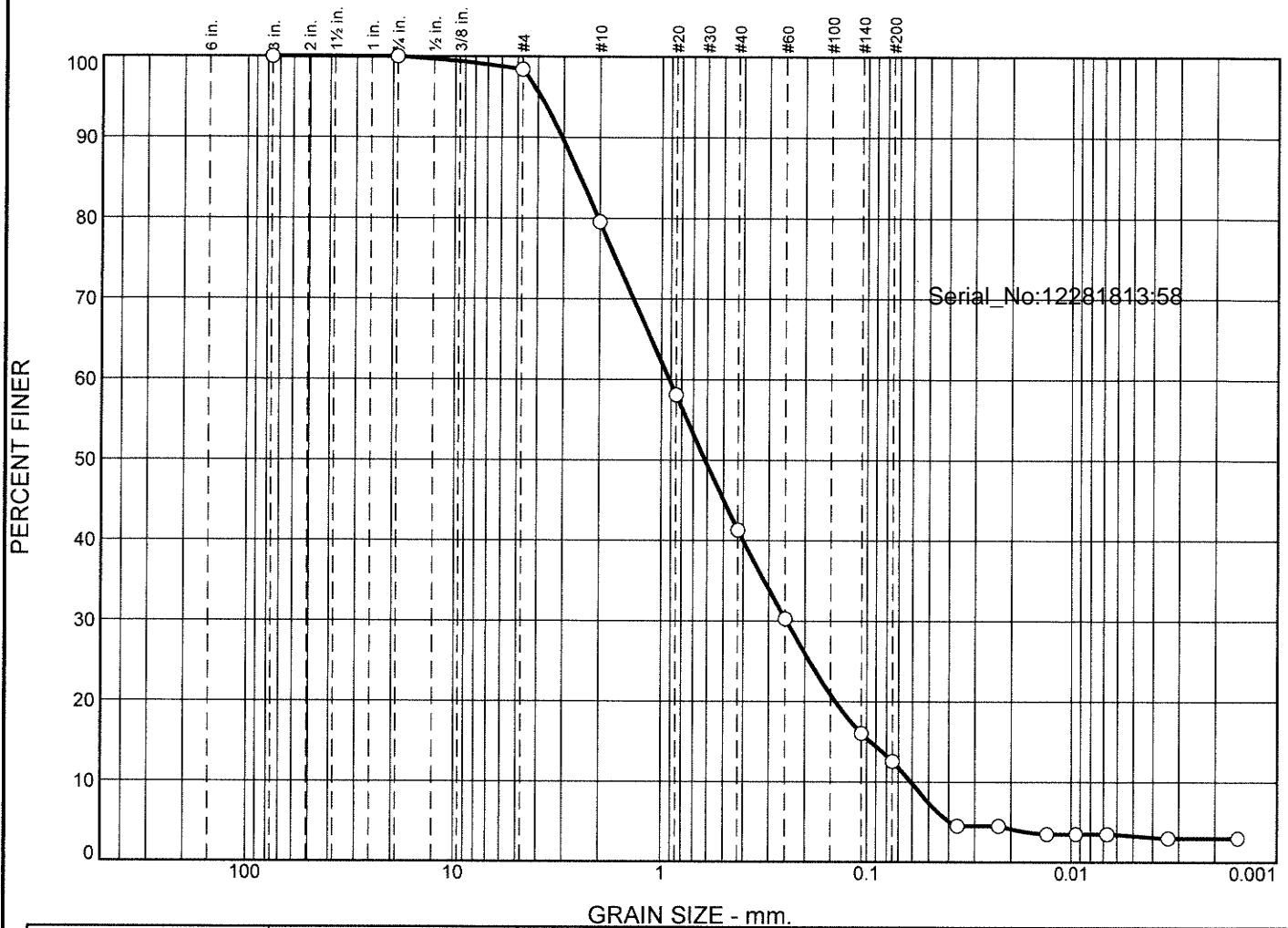
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.7 | 0.7 | 4.8 | 20.8 | 32.8 | 58.4 | 32.6 | 8.3 | 40.9 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 0.0136 | 0.0345 | 0.0438 | 0.0566 | 0.0731 | 0.1109 | 0.1829 | 0.6652 | 0.9464 | 1.3548 | 2.1005 |

| Fineness Modulus | C _u | C _c |
|------------------|----------------|----------------|
| 1.14 | 13.48 | 1.29 |

Alpha Analytical

Particle Size Distribution Report



| | % +3" | | % Gravel | | % Sand | | | % Fines | | | |
|---|----------|----|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | |
| ○ | 0.0 | | 0.0 | 1.6 | 18.9 | 38.2 | 28.7 | 9.3 | | 3.3 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| × | Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| ○ | | | | 2.4782 | 0.9165 | 0.6133 | 0.2461 | 0.0958 | 0.0610 | 1.08 | 15.01 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Material Description | | | | | | | | | USCS | AASHTO |
|----------------------|--|--|--|--|--|--|--|--|------|--------|
| ○ | | | | | | | | | | |

| | | |
|--|--|-----------------|
| Project No. Project: ○ Source of Sample: MP-RB-SED-07-120418 Date: ○ Alpha Analytical Mansfield, MA | Client: Sample Number: L1849652-16 Figure | Remarks: |
|--|--|-----------------|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-07-120418

Sample Number: L1849652-16

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 34.91

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 34.91 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.56 | 0.00 | 98.4 |
| | | #10 | 6.58 | 0.00 | 79.5 |
| | | #20 | 7.48 | 0.00 | 58.1 |
| | | #40 | 5.86 | 0.00 | 41.3 |
| | | #60 | 3.85 | 0.00 | 30.3 |
| | | #140 | 4.98 | 0.00 | 16.0 |
| | | #200 | 1.21 | 0.00 | 12.6 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 12.6

Weight of hydrometer sample = 19.7

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0363 | 4.5 |
| 5.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0230 | 4.5 |
| 15.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0134 | 3.5 |
| 30.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0095 | 3.5 |
| 60.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0067 | 3.5 |
| 240.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0034 | 3.0 |
| 1140.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0015 | 3.0 |

Fractional Components

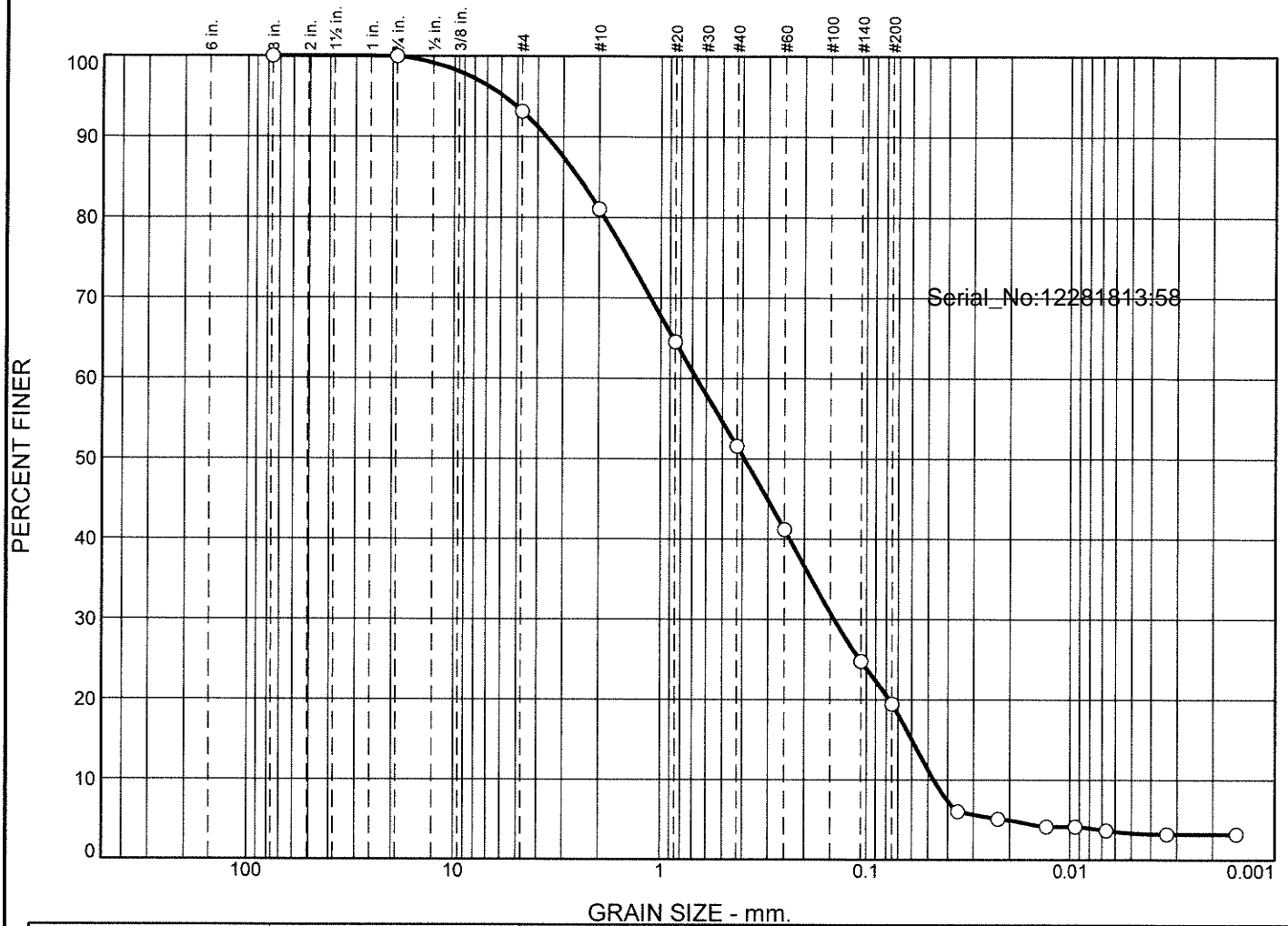
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 1.6 | 1.6 | 18.9 | 38.2 | 28.7 | 85.8 | 9.3 | 3.3 | 12.6 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 0.0396 | 0.0610 | 0.0958 | 0.1421 | 0.2461 | 0.4001 | 0.6133 | 0.9165 | 2.0358 | 2.4782 | 3.0464 | 3.8581 |

| Finesness Modulus | C _u | C _c |
|-------------------|----------------|----------------|
| 2.48 | 15.01 | 1.08 |

Alpha Analytical

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | | |
|------------------|----------|----------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | | |
| ○ | 0.0 | | 0.0 | 6.8 | 12.2 | 29.4 | 32.1 | 16.1 | | 3.4 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| × | Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| ○ | | | | 2.5376 | 0.6675 | 0.3909 | 0.1433 | 0.0599 | 0.0470 | 0.65 | 14.21 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Material Description | | | | | | | | USCS | AASHTO |
|----------------------|--|--|--|--|--|--|--|------|--------|
| | | | | | | | | | |

| | | |
|--|---|--|
| Project No. Project: ○ Source: MP-RB-SED-07FD-120418 Sample No.: L1849652-17 Date: ○ | Client: Alpha Analytical Mansfield, MA | Remarks: Figure |
|--|---|--|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-07FD-120418

Sample Number: L1849652-17

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 24.25

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 24.25 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 1.66 | 0.00 | 93.2 |
| | | #10 | 2.94 | 0.00 | 81.0 |
| | | #20 | 3.99 | 0.00 | 64.6 |
| | | #40 | 3.15 | 0.00 | 51.6 |
| | | #60 | 2.52 | 0.00 | 41.2 |
| | | #140 | 3.98 | 0.00 | 24.8 |
| | | #200 | 1.29 | 0.00 | 19.5 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 19.5

Weight of hydrometer sample = 33.1

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0060 | 1.0064 | 0.0132 | 6.0 | 14.7 | 0.0357 | 6.0 |
| 5.00 | 22.9 | 1.0050 | 1.0054 | 0.0132 | 5.0 | 15.0 | 0.0228 | 5.1 |
| 15.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0133 | 4.1 |
| 30.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0094 | 4.1 |
| 60.00 | 22.9 | 1.0035 | 1.0039 | 0.0132 | 3.5 | 15.4 | 0.0067 | 3.7 |
| 240.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0033 | 3.2 |
| 1140.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0015 | 3.2 |

Fractional Components

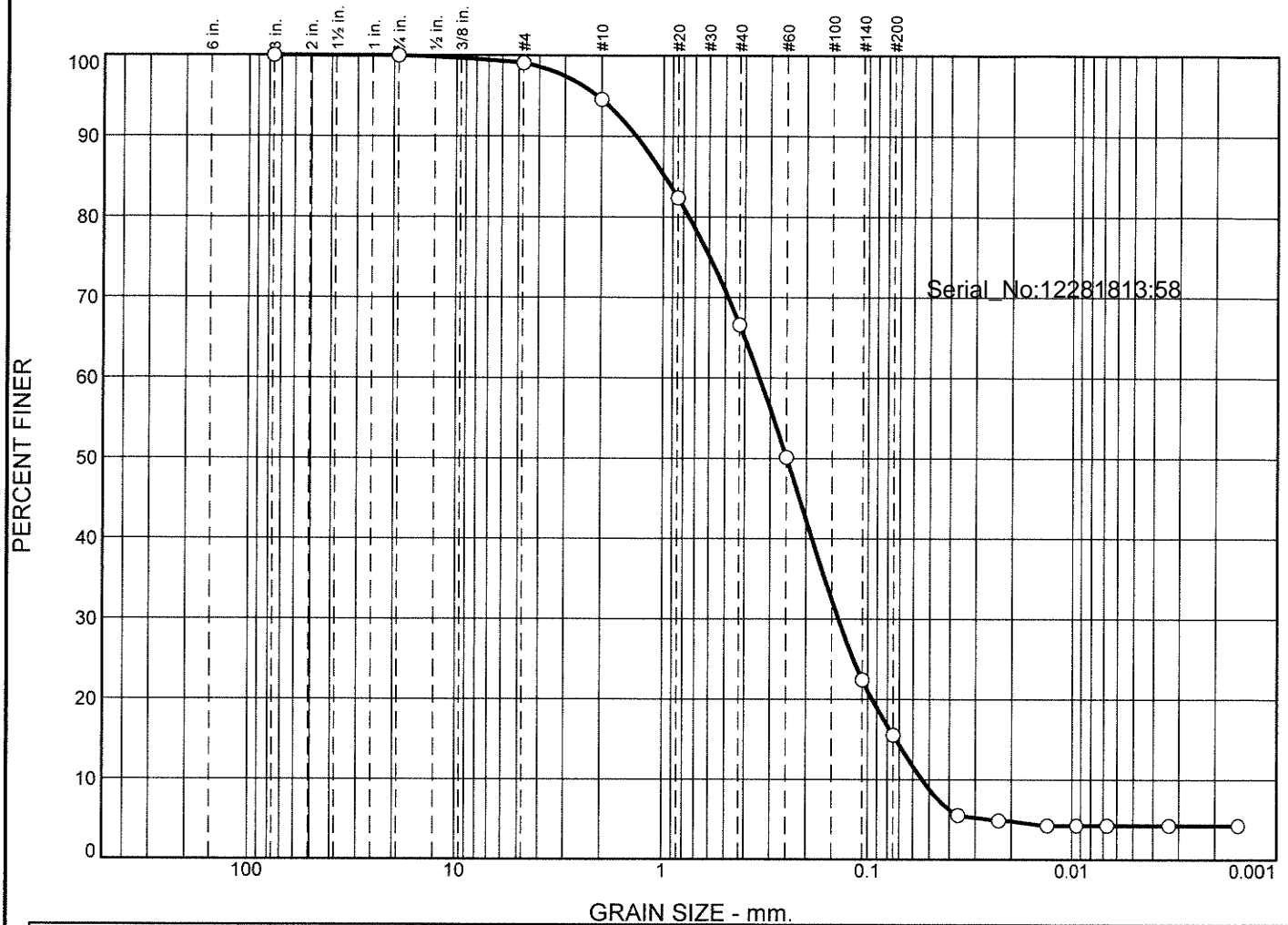
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 6.8 | 6.8 | 12.2 | 29.4 | 32.1 | 73.7 | 16.1 | 3.4 | 19.5 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 0.0206 | 0.0470 | 0.0599 | 0.0774 | 0.1433 | 0.2358 | 0.3909 | 0.6675 | 1.8875 | 2.5376 | 3.6044 | 5.8092 |

| Fineness Modulus | C _u | C _c |
|------------------|----------------|----------------|
| 2.20 | 14.21 | 0.65 |

Alpha Analytical

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | | |
|------------------|----------|----------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | | |
| ○ | 0.0 | | 0.0 | 0.9 | 4.5 | 28.0 | 51.1 | 11.2 | | 4.3 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| × | Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| ○ | | | | 0.9838 | 0.3388 | 0.2491 | 0.1390 | 0.0728 | 0.0542 | 1.05 | 6.25 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Material Description | | | | | | | | USCS | AASHTO |
|----------------------|--|--|--|--|--|--|--|------|--------|
| ○ | | | | | | | | | |

| | | |
|---|---|--------------------------------------|
| Project No. Project: ○ Source of Sample: MP-RB-SED-04-120418 Sample Number: L1849652-18 Date: ○ | Client: Alpha Analytical Mansfield, MA | Remarks: Figure |
|---|---|--------------------------------------|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-04-120418

Sample Number: L1849652-18

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.12

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 17.12 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.16 | 0.00 | 99.1 |
| | | #10 | 0.77 | 0.00 | 94.6 |
| | | #20 | 2.09 | 0.00 | 82.4 |
| | | #40 | 2.70 | 0.00 | 66.6 |
| | | #60 | 2.82 | 0.00 | 50.1 |
| | | #140 | 4.74 | 0.00 | 22.4 |
| | | #200 | 1.18 | 0.00 | 15.5 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 15.5

Weight of hydrometer sample = 19.91

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0363 | 5.5 |
| 5.00 | 22.9 | 1.0035 | 1.0039 | 0.0132 | 3.5 | 15.4 | 0.0231 | 4.9 |
| 15.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0134 | 4.3 |
| 30.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0095 | 4.3 |
| 60.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0067 | 4.3 |
| 240.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0033 | 4.3 |
| 1140.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0015 | 4.3 |

Fractional Components

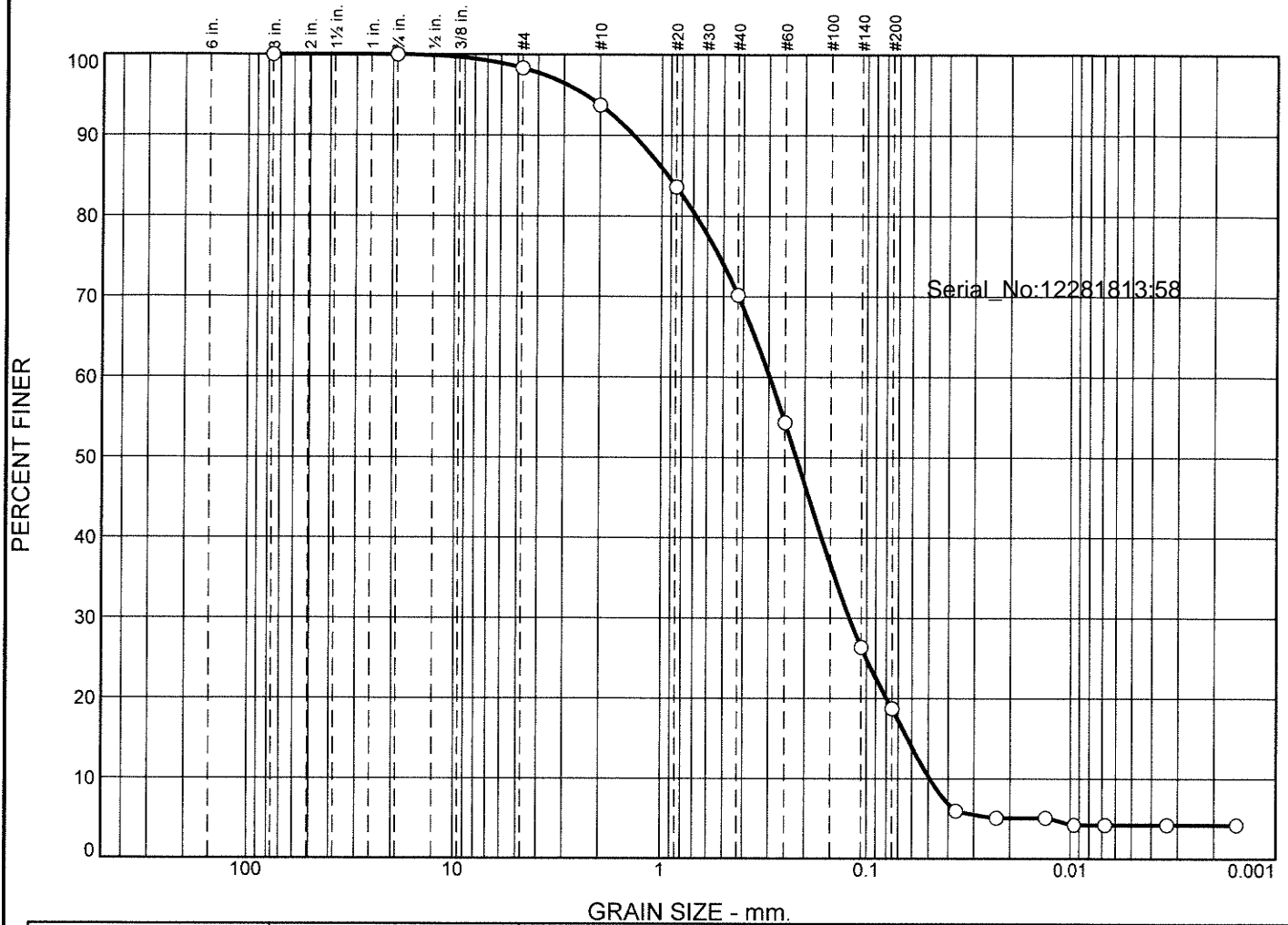
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.9 | 0.9 | 4.5 | 28.0 | 51.1 | 83.6 | 11.2 | 4.3 | 15.5 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 0.0253 | 0.0542 | 0.0728 | 0.0950 | 0.1390 | 0.1872 | 0.2491 | 0.3388 | 0.7525 | 0.9838 | 1.3533 | 2.0979 |

| Fineness Modulus | C _u | C _c |
|------------------|----------------|----------------|
| 1.54 | 6.25 | 1.05 |

Alpha Analytical

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | | |
|-------------------------------------|----------|----------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | | |
| <input type="radio"/> | 0.0 | 0.0 | 1.7 | 4.6 | 23.5 | 51.5 | 14.5 | | 4.2 | | |
| <input checked="" type="checkbox"/> | Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| <input type="radio"/> | | | | 0.9326 | 0.2974 | 0.2204 | 0.1211 | 0.0631 | 0.0492 | 1.00 | 6.05 |

| Material Description | USCS | AASHTO |
|-----------------------|------|--------|
| <input type="radio"/> | | |

| | | |
|--|---|--|
| Project No. Project: <input type="radio"/> Source: MP-RB-SED-04-120418 Sample No.: WG1186360-1 Date: <input type="radio"/> | Client: Alpha Analytical Mansfield, MA | Remarks: Figure |
|--|---|--|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-04-120418

Sample Number: WG1186360-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 15.02

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 15.02 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.25 | 0.00 | 98.3 |
| | | #10 | 0.69 | 0.00 | 93.7 |
| | | #20 | 1.52 | 0.00 | 83.6 |
| | | #40 | 2.02 | 0.00 | 70.2 |
| | | #60 | 2.38 | 0.00 | 54.3 |
| | | #140 | 4.20 | 0.00 | 26.4 |
| | | #200 | 1.15 | 0.00 | 18.7 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 18.7

Weight of hydrometer sample = 17.07

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0367 | 6.0 |
| 5.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0233 | 5.1 |
| 15.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0134 | 5.1 |
| 30.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0095 | 4.2 |
| 60.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0068 | 4.2 |
| 240.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0034 | 4.2 |
| 1140.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0015 | 4.2 |

Fractional Components

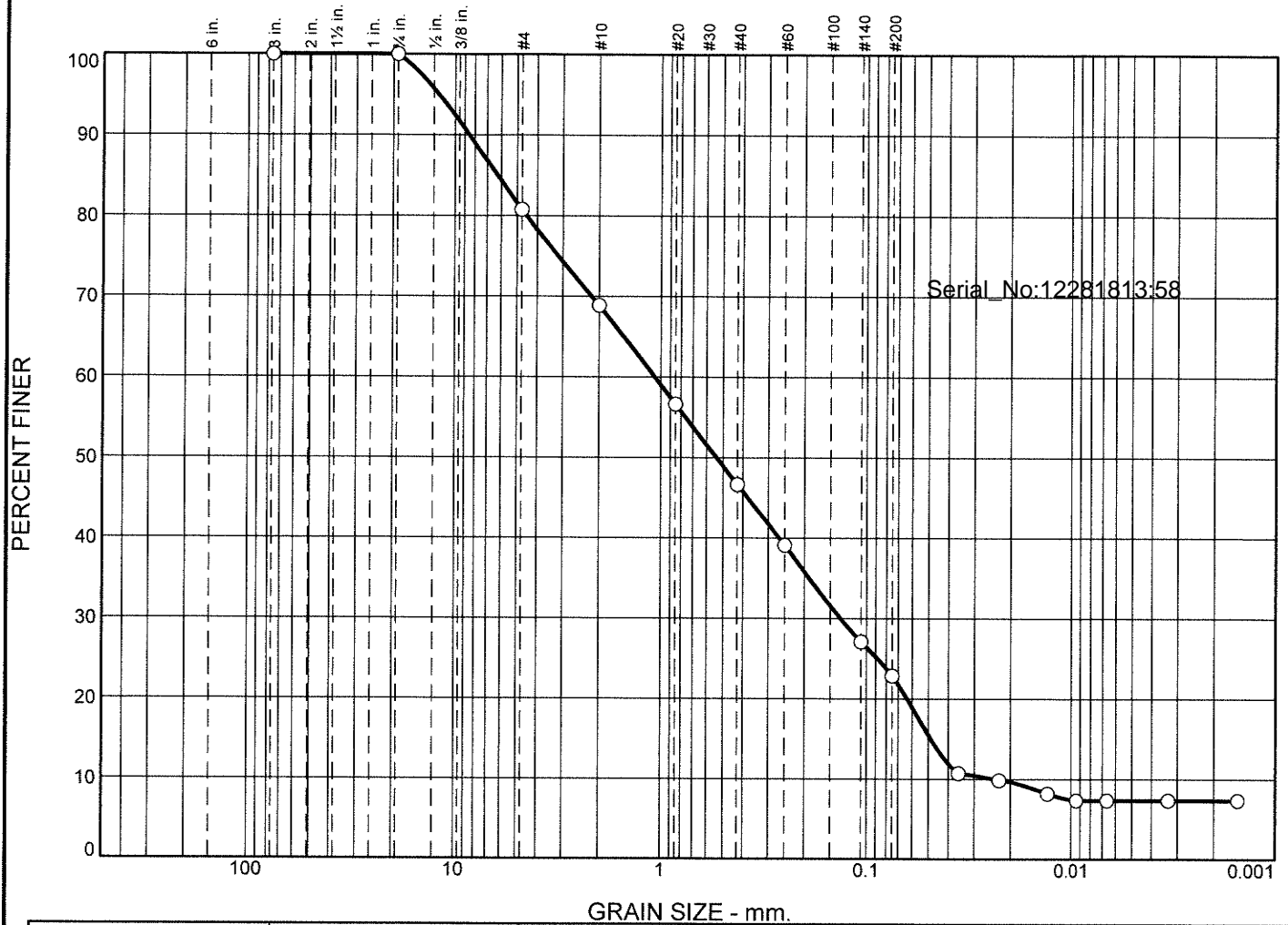
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 1.7 | 1.7 | 4.6 | 23.5 | 51.5 | 79.6 | 14.5 | 4.2 | 18.7 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 0.0129 | 0.0492 | 0.0631 | 0.0798 | 0.1211 | 0.1655 | 0.2204 | 0.2974 | 0.6800 | 0.9326 | 1.3702 | 2.3586 |

| Finesness Modulus | C _u | C _c |
|-------------------|----------------|----------------|
| 1.44 | 6.05 | 1.00 |

Alpha Analytical

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | | |
|------------------|--|----------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | | |
| ○ 0.0 | | 0.0 | 19.2 | 11.9 | 22.3 | 23.7 | 15.6 | | 7.3 | | |
| X Colloids | | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| ○ | | | | 6.2360 | 1.0707 | 0.5377 | 0.1335 | 0.0487 | 0.0241 | 0.69 | 44.37 |

| Material Description | | | | | | | | USCS | AASHTO |
|----------------------|--|--|--|--|--|--|--|------|--------|
| ○ | | | | | | | | | |

| | |
|---|--|
| Project No. Project: ○ Source of Sample: MP-RB-SED-05-120418 Sample Number: L1849652-19 Date: ○ <div style="text-align: center;"> Alpha Analytical Mansfield, MA </div> | Client: Remarks: <div style="text-align: right;"> Figure </div> |
|---|--|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-05-120418

Sample Number: L1849652-19

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 28.94
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 28.94 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 5.57 | 0.00 | 80.8 |
| | | #10 | 3.44 | 0.00 | 68.9 |
| | | #20 | 3.54 | 0.00 | 56.6 |
| | | #40 | 2.89 | 0.00 | 46.6 |
| | | #60 | 2.18 | 0.00 | 39.1 |
| | | #140 | 3.48 | 0.00 | 27.1 |
| | | #200 | 1.22 | 0.00 | 22.9 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 22.9
Weight of hydrometer sample = 21.97
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0060 | 1.0064 | 0.0132 | 6.0 | 14.7 | 0.0357 | 10.7 |
| 5.00 | 22.9 | 1.0055 | 1.0059 | 0.0132 | 5.5 | 14.8 | 0.0227 | 9.9 |
| 15.00 | 22.9 | 1.0045 | 1.0049 | 0.0132 | 4.5 | 15.1 | 0.0132 | 8.2 |
| 30.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0094 | 7.3 |
| 60.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0066 | 7.3 |
| 240.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0033 | 7.3 |
| 1140.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0015 | 7.3 |

Fractional Components

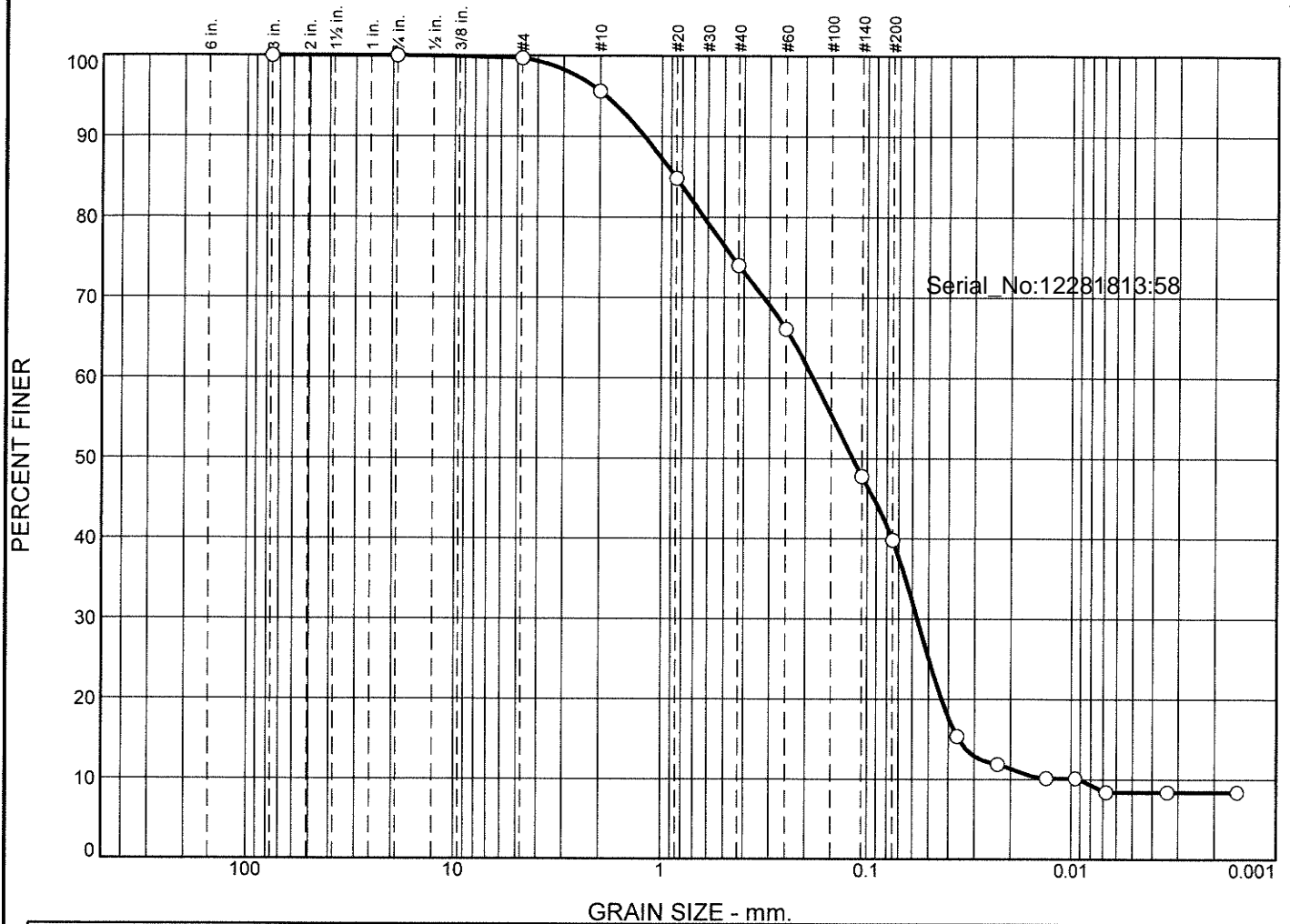
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 19.2 | 19.2 | 11.9 | 22.3 | 23.7 | 57.9 | 15.6 | 7.3 | 22.9 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 0.0241 | 0.0487 | 0.0634 | 0.1335 | 0.2657 | 0.5377 | 1.0707 | 4.5156 | 6.2360 | 8.5348 | 11.9932 |

| Fineness Modulus | C _u | C _c |
|------------------|----------------|----------------|
| 2.70 | 44.37 | 0.69 |

Alpha Analytical

Particle Size Distribution Report



| GRAIN SIZE - mm. | | | | | | | | | | |
|------------------|----|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| % +3" | | % Gravel | | % Sand | | | % Fines | | | |
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | |
| 0.0 | | 0.0 | 0.3 | 4.1 | 21.6 | 34.2 | 31.4 | | 8.4 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Colloids | LL | PL | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
| | | | 0.8612 | 0.1840 | 0.1176 | 0.0568 | 0.0357 | 0.0092 | 1.91 | 20.10 |
| | | | | | | | | | | |
| | | | | | | | | | | |

| Material Description | | | | | | | | USCS | AASHTO |
|----------------------|--|--|--|--|--|--|--|------|--------|
| | | | | | | | | | |

| | |
|---|--|
| Project No. Project: ○ Source of Sample: MP-RB-SED-06-120418 Sample Number: L1849652-20 Date: ○ <div>Alpha Analytical</div> <div>Mansfield, MA</div> | Remarks: <div>Figure</div> |
|---|--|

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-RB-SED-06-120418

Sample Number: L1849652-20

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.51

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|-----------------------------|--------------|--------------------|-------------------------|----------------------|---------------|
| 21.51 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.06 | 0.00 | 99.7 |
| | | #10 | 0.88 | 0.00 | 95.6 |
| | | #20 | 2.33 | 0.00 | 84.8 |
| | | #40 | 2.32 | 0.00 | 74.0 |
| | | #60 | 1.70 | 0.00 | 66.1 |
| | | #140 | 3.94 | 0.00 | 47.8 |
| | | #200 | 1.71 | 0.00 | 39.8 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 39.8

Weight of hydrometer sample = 18.3

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|---------------------|-----------------|----------------|-------------------|--------|-----|------------|----------------|---------------|
| 2.00 | 22.9 | 1.0040 | 1.0044 | 0.0132 | 4.0 | 15.2 | 0.0363 | 15.4 |
| 5.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0232 | 11.9 |
| 15.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0134 | 10.1 |
| 30.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0095 | 10.1 |
| 60.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0068 | 8.4 |
| 240.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0034 | 8.4 |
| 1140.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0015 | 8.4 |

Fractional Components

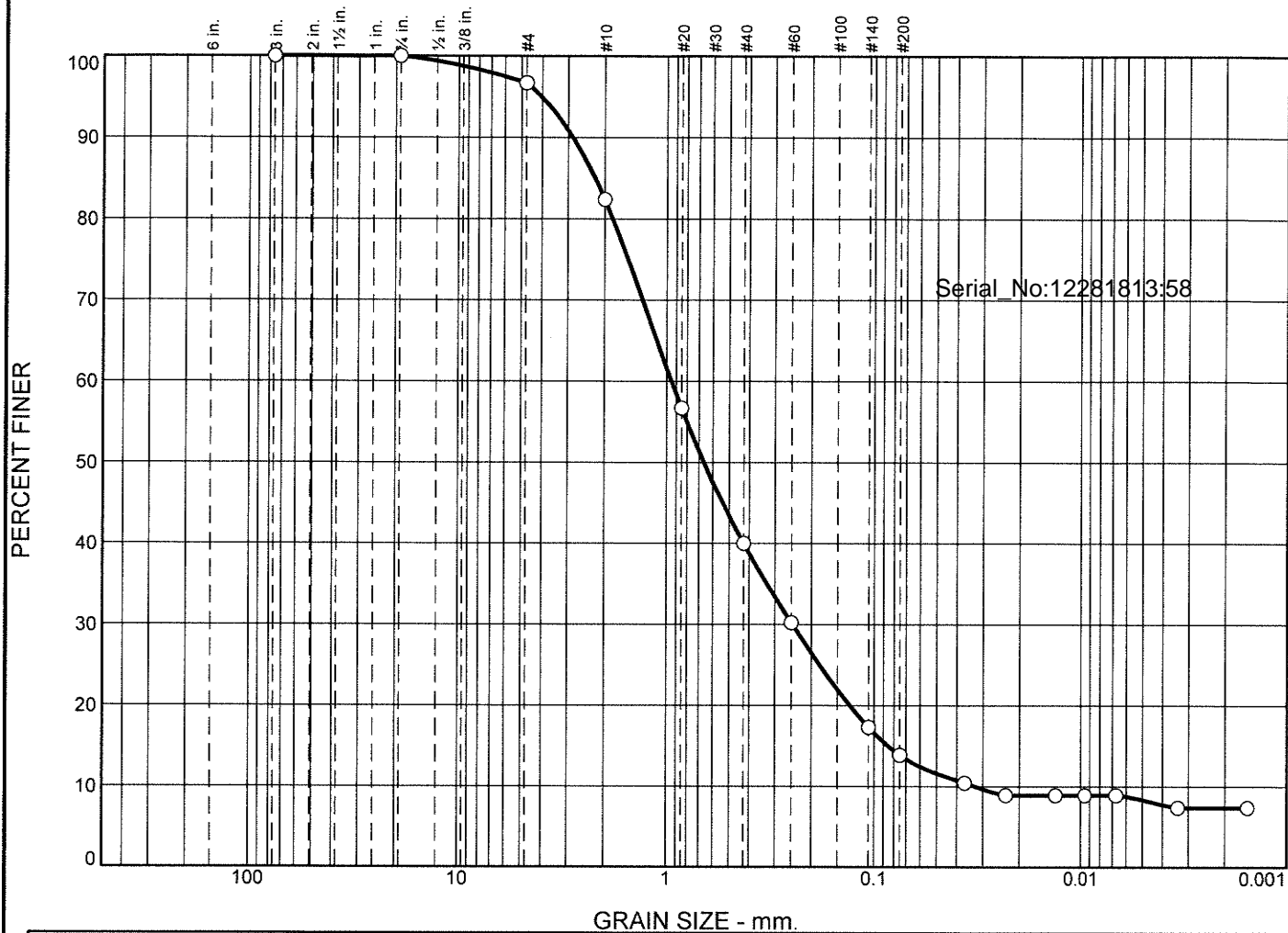
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.3 | 0.3 | 4.1 | 21.6 | 34.2 | 59.9 | 31.4 | 8.4 | 39.8 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 0.0092 | 0.0357 | 0.0433 | 0.0568 | 0.0754 | 0.1176 | 0.1840 | 0.6274 | 0.8612 | 1.2149 | 1.8666 |

| Fineness Modulus | C _u | C _c |
|------------------|----------------|----------------|
| 1.10 | 20.10 | 1.91 |

Alpha Analytical

Particle Size Distribution Report



| | % +3" | | % Gravel | | % Sand | | | % Fines | | | |
|---|----------|----|----------|--------|--------|--------|--------|---------|--------|------|-------|
| | | | Coarse | Fine | Coarse | Medium | Fine | Silt | | Clay | |
| ○ | 0.0 | | 0.0 | 3.3 | 14.3 | 42.4 | 26.1 | 5.6 | | 8.3 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| ✕ | Colloids | LL | PL | D85 | D60 | D50 | D30 | D15 | D10 | Cc | Cu |
| ○ | | | | 2.2298 | 0.9505 | 0.6629 | 0.2466 | 0.0855 | 0.0328 | 1.95 | 28.95 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

GRAIN SIZE DISTRIBUTION TEST DATA

12/27/2018

Location: MP-UW-SED-02-120418

Sample Number: L1849652-21

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 6.35

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|--------------------------------------|-----------------|--------------------------|-------------------------------|----------------------------|------------------|
| 6.35 | 0.00 | 3 | 0.00 | 0.00 | 100.0 |
| | | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.21 | 0.00 | 96.7 |
| | | #10 | 0.91 | 0.00 | 82.4 |
| | | #20 | 1.63 | 0.00 | 56.7 |
| | | #40 | 1.06 | 0.00 | 40.0 |
| | | #60 | 0.62 | 0.00 | 30.2 |
| | | #140 | 0.82 | 0.00 | 17.3 |
| | | #200 | 0.22 | 0.00 | 13.9 |

Serial_No:12281813:58

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 13.9

Weight of hydrometer sample = 7.24

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

| Elapsed Time (min.) | Temp. (deg. C.) | Actual Reading | Corrected Reading | K | Rm | Eff. Depth | Diameter (mm.) | Percent Finer |
|------------------------|--------------------|-------------------|----------------------|--------|-----|---------------|-------------------|------------------|
| 2.00 | 22.9 | 1.0030 | 1.0034 | 0.0132 | 3.0 | 15.5 | 0.0367 | 10.4 |
| 5.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0233 | 8.9 |
| 15.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0134 | 8.9 |
| 30.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0095 | 8.9 |
| 60.00 | 22.9 | 1.0025 | 1.0029 | 0.0132 | 2.5 | 15.6 | 0.0067 | 8.9 |
| 240.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0034 | 7.4 |
| 1140.00 | 22.9 | 1.0020 | 1.0024 | 0.0132 | 2.0 | 15.8 | 0.0015 | 7.4 |

Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---------|--------|------|-------|--------|--------|------|-------|-------|------|-------|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 3.3 | 3.3 | 14.3 | 42.4 | 26.1 | 82.8 | 5.6 | 8.3 | 13.9 |

| D ₅ | D ₁₀ | D ₁₅ | D ₂₀ | D ₃₀ | D ₄₀ | D ₅₀ | D ₆₀ | D ₈₀ | D ₈₅ | D ₉₀ | D ₉₅ |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 0.0328 | 0.0855 | 0.1305 | 0.2466 | 0.4250 | 0.6629 | 0.9505 | 1.8295 | 2.2298 | 2.8515 | 4.0226 |

| Fineness Modulus | C _u | C _c |
|---------------------|----------------|----------------|
| 2.49 | 28.95 | 1.95 |

Alpha Analytical

Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 12

Published Date: 10/9/2018 4:58:19 PM

Page 1 of 1

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility**EPA 624/624.1:** m/p-xylene, o-xylene**EPA 8260C:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**EPA 6860:** SCM: Perchlorate**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.**Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:**Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:** Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg. EPA 522.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

CHAIN OF CUSTODY

PAGE 1 OF 3

Date Rec'd in Lab:

12/05/18

ALPHA Job #:

11849652

Project Information

Project Name: MCCLENNEN PARK

Project Location: ARLINGTON, MA

Project #: 2017-0069

Project Manager: JOE FAMELY

ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☒ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods
☒ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program Criteria

Client Information

Client: WOODS HOLE GROUP

Address: 107 WATERHOUSE RD.
BOURNE, MA 02532

Phone: 508-540-8080

Email: jfamily@whgrp.com

Additional Project Information:

"RCRA 8+" = RCRA 8 + Cu + Fe + Mn + Zn

BILL TO TOWN OF ARLINGTON (CONTACT VIA SUSAN CHAPMAN)

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection | | Sample Matrix | Sampler Initials | VOC: | SVOC: | METAL: | METAL: | EPH: | VPH: | D PCB: | TPH: | HAA: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|-----------|------------|--|---------------|------------------|------|-------|--------|--------|------|------|--------|------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|--------------------------------|-----------|------------|--|---------------|------------------|------|-------|--------|--------|------|------|--------|------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Container Type

P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative

A= None
B= HCl
C= HNO₃
D= H₂SO₄
E= NaOH
F= MeOH
G= NaHSO₄
H= Na₂S₂O₃
I= Ascorbic Acid
J= NH₄Cl
K= Zn Acetate
O= Other

Container Type

Preservative

P

A

P

C

Relinquished By:

Date/Time

Received By:

Date/Time

[Signature]

12/5/18 11:00
12/5/18 1252

[Signature] AR
Chen & Lebeau

12/5/18 11:00
12/5/18 1252

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)



8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

CHAIN OF CUSTODY

PAGE 2 OF 3

Date Rec'd in Lab: 12/05/18

ALPHA Job #: 11849652

Project Information

Project Name: MCCLENNEN PARK

Project Location: ARLINGTON, MA

Project #: 2017-0069

Project Manager: JOE FAMELY

ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Report Information - Data Deliverables

☒ ADEX ☒ EMAIL

Billing Information

☐ Same as Client Info PO #:

Regulatory Requirements & Project Information Requirements

☒ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods
☒ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program Criteria

Client Information

Client: WOODS HOLE GROUP

Address: 107 WATERHOUSE RD.
BOURNE, MA 02532

Phone: 508-540-8080

Email: jfamelye@whgrp.com

Additional Project Information:

"RCRA 8+" = RCRA 8 + Cu + Fe + Mn + Zn

BILL TO TOWN OF ARLINGTON (CONTACT VIA SUSAN CHAPNICK)

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection | | Sample Matrix | Sampler Initials | VOC: | SVOC: | METAL | METAL | EPH: <input type="checkbox"/> | VPH: <input type="checkbox"/> | <input type="checkbox"/> PCB | TPH: <input type="checkbox"/> | HARD | META | TOC | GRAIN | | Sample Comments | LEN |
|--------------------------------|---------------------------|------------|-------|---------------|------------------|------|-------|--------------|-------|-------------------------------|-------------------------------|------------------------------|-------------------------------|------|------|-----|-------|--|-----------------|-----|
| | | Date | Time | | | | | | | | | | | | | | | | | |
| 49652-01 | MP-RB-SW-08-120418 | 12/4/18 | 10:13 | SW | KL | | | 1 | 1 | | | | | 1 | | | | | | 2 |
| 12 | MP-RB-SW-08L-120418 | ↓ | 10:18 | ↓ | ↓ | | | 1 | 1 | | | | | 1 | | | | | | 2 |
| 13 | MP-SW-EB-120418 | | 11:05 | ↓ | ↓ | | | 1 | 1 | | | | | | | | | | | 1 |
| 14 | MP-RB-SED-08-120418 | | 10:22 | SED | ↓ | | | | | | | | | | 1 | 1 | 1 | | | 2 |
| 15 | MP-RB-SED-03-120418 | | 10:30 | ↓ | 8F | | | | | | | | | | 1 | 1 | 1 | | | 2 |
| 16 | MP-RB-SED-07-120418 | | 12:30 | ↓ | ↓ | | | | | | | | | | 1 | 1 | 1 | | | 2 |
| 17 | MP-RB-SED-07 FD-120418 | | 12:50 | ↓ | ↓ | | | | | | | | | | 1 | 1 | 1 | | | 2 |
| 18 | MP-RB-SED-04 MS/MD-120418 | | 13:10 | ↓ | ↓ | | | | | | | | | | 3 | 1 | 1 | | | 4 |
| 19 | MP-RB-SED-05-120418 | 13:30 | ↓ | ↓ | | | | | | | | | | 1 | 1 | 1 | | | 2 | |
| 20 | MP-RB-SED-06-120418 | ↓ | 13:50 | ↓ | ↓ | | | | | | | | | 1 | 1 | 1 | | | 2 | |

Container Type

P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative

A= None
B= HCl
C= HNO₃
D= H₂SO₄
E= NaOH
F= MeOH
G= NaHSO₄
H= Na₂S₂O₃
I= Ascorbic Acid
J= NH₄Cl
K= Zn Acetate
O= Other

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

PAGE 2 OF 2

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

"RCRA 8+" = RCRA 8 + Cu + Fe + Mn + Zn
BILL TO TOWN OF ARLINGTON (CONTACT VIA SUSAN CHAPNICK)

☐ RUSH (only confirmed if pre-approved!)

| ANALYSIS | | SAMPLE INFO | |
|--|--|------------------------------------|--|
| VOC: <input type="checkbox"/> 8260 <input type="checkbox"/> 624 <input type="checkbox"/> 524.2 | | Filtration | |
| SVOC: <input type="checkbox"/> ABN <input type="checkbox"/> PAH | | <input type="checkbox"/> Field | |
| METALS: <input type="checkbox"/> MCP 13 <input type="checkbox"/> MCP 14 <input type="checkbox"/> RCP 15 | | <input type="checkbox"/> Lab to do | |
| METALS: <input type="checkbox"/> RCRA5 <input checked="" type="checkbox"/> RCRA8 + <input type="checkbox"/> PP13 | | Preservation | |
| EPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only | | <input type="checkbox"/> Lab to do | |
| VPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only | | | |
| <input type="checkbox"/> PCB <input type="checkbox"/> PEST | | | |
| TPH: <input type="checkbox"/> Quant Only <input type="checkbox"/> Fingerprint | | | |
| TOC | | | |
| GRAIN SIZE | | | |
| Sample Comments | | | |

[illegible]

A = None
B = HCl
C = HNO₃
D = H₂SO₄
E = NaOH
F = MeOH
G = NaHSO₄
H = Na₂S₂O₃
I = Ascorbic Acid
J = NH₄Cl
K = Zn Acetate
O = Other

FORM NO: 01-01 (rev. 12-Mar-2012)



Data Validation Report

Client/Company: The Town of Arlington, MA & Woods Hole Group (WHG)

Site/Project Name: McClennen Park Detention Basins / Reeds Brook Assessment
Fall 2018 Sampling

Laboratory: Alpha Analytical Laboratory, Westborough, MA

SDGs/Lab Project #: L1849652

Date(s) of Collection: December 4, 2018

**Number and type
Samples & analyses:** 12 surface water (SW) samples plus 1 Field Equipment Blank for
project-specific list of 12 Dissolved (lab-filtered) Metals
8 sediment (Sed) samples for project-specific list of 12 Total Metals

Senior Data Reviewers: Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date Completed: March 26, 2019

An EPA Stage 2B data validation (DV) review (USEPA-540-R-08-005, Jan 2009) was performed for a project-specific list of 12 Metals analyzed by USEPA SW846 Methods 6020B, 7470A, & 7471B using MassDEP Compendium of Analytical Method (CAM) protocols. DV review was based on the CAM, the USEPA National Functional Guidelines for data review, the USEPA SW846 Method criteria, and professional judgment.

The Massachusetts Contingency Plan (MCP) required Certification Form was present in the data package and the required questions A through F were answered in the affirmative. Therefore, the data meet the "presumptive certainty" status under the MCP for LSP decisions. The "No" answer to question H has to do with matrix QC results, which were documented in the lab narrative, as required, and reviewed during data validation.

Data Validation Summary

During this DV review of 12 Dissolved Metals in Surface Water and 12 Total Metals in Sediments, nine SW results were negated (U) due to equipment blank actions and Sed results were estimated (J or UJ) due to matrix QC issues. Table 1 presents the samples and analytical parameters validated and Table 2 summarizes the DV actions taken. NEH generated a validated electronic data deliverable (EDD) based on the EDD file received from Alpha Analytical. All results were considered acceptable compared to MassDEP CAM protocols, and usable for project decisions based on USEPA DV guidance and method criteria, with the understanding of the potential uncertainty (bias) in the qualified results, including heterogeneity for manganese and zinc in sediment.

Table 1. Samples and Analytical Parameters Validated

| Sample ID | Lab ID | Sampling Date | Matrix | Analytical Parameters ¹ | Sample Type |
|-----------------------|-------------|---------------|--------|------------------------------------|---------------------------------|
| MP-RB-SW-01-120418 | L1849652-01 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-02-120418 | L1849652-02 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-03-120418 | L1849652-03 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-07-120418 | L1849652-04 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-07FD-120418 | L1849652-05 | 12/4/2018 | SW | 12 Diss. Metals | Field Duplicate of MP-RB-SW-07 |
| MP-RB-SW-04-120418 | L1849652-06 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-05-120418 | L1849652-07 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-06-120418 | L1849652-08 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-UW-01-120418 | L1849652-09 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-UW-02-120418 | L1849652-10 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-08-120418 | L1849652-11 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-RB-SW-08L-120418 | L1849652-12 | 12/4/2018 | SW | 12 Diss. Metals | Field Sample |
| MP-SW-EB-120418 | L1849652-13 | 12/4/2018 | Water | 12 Diss. Metals | Equipment Blank |
| MP-RB-SED-08-120418 | L1849652-14 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |
| MP-RB-SED-03-120418 | L1849652-15 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |
| MP-RB-SED-07-120418 | L1849652-16 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |
| MP-RB-SED-07FD-120418 | L1849652-17 | 12/4/2018 | Sed | 12 Tot. Metals | Field Duplicate of MP-RB-SED-07 |

Table 1. Samples and Analytical Parameters Validated - continued

| Sample ID | Lab ID | Sampling Date | Matrix | Analytical Parameters ¹ | Sample Type |
|---------------------|-------------|---------------|--------|------------------------------------|--------------|
| MP-RB-SED-04-120418 | L1849652-18 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |
| MP-RB-SED-05-120418 | L1849652-19 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |
| MP-RB-SED-06-120418 | L1849652-20 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |
| MP-UW-SED-02-120418 | L1849652-21 | 12/4/2018 | Sed | 12 Tot. Metals | Field Sample |

¹ Field samples were also analyzed for other parameters that were not validated. These included Hardness in SW and TOC, % Solids, and Grain Size Distribution in Sed.

Analytical Methods:

ICP-MS Metals: USEPA SW846 Method 6020B, using MCP CAM IIID protocols for project-specific list of arsenic, barium, cadmium, chromium, copper, lead, iron, manganese, selenium, silver, and zinc

CVA Mercury: USEPA SW846 Method 7470A for SW and 7471B for Sed, using MCP CAM IIIB protocols

Dissolved (Filtered) Metals: SW collected unpreserved, Lab-Filtered 0.45 µm pore size, Lab-preserved pH<2 with nitric acid

Total Metals: Sed maintained at 4±2°C

The following QC elements, as applicable to the analytical Metals methods, were reviewed:

- Data package completeness and reporting protocols
- MCP Certification Form
- Sample receipt, holding times, and preservation criteria
- Calibration criteria (instrument tuning, initial and continuing calibration verifications)
- Method blank and field equipment blank results
- Laboratory Control Sample (LCS), LCS Duplicate, and/or Standard Reference Material recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- LCS/LCSD, MS/MSD, sample/Lab Duplicate, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including reporting limits and units)
- Other method-specific QC if applicable and reported (e.g., serial dilution analysis for Metals)
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

Note that for the EPA Stage 2B DV review, raw data are not evaluated and calibration criteria are assumed to be CAM-compliant unless otherwise noted in the lab narrative.

This DV Report consists of three parts: 1) the DV Summary Report; 2) the DV Checklist attached that documents all of the QC reviewed and the issues that required action or affected the data certainty in terms of accuracy, precision, representativeness, and sensitivity; and 3) the validated EDD. As only the Metals data were validated, data users should note that the EDD also presents additional unvalidated data for Hardness, TOC, % Solids, and Grain Size Distribution.

Table 2. Summary of Data Validation Actions

| Field Sample ID | Analyte | DV Qualifier | Bias | DV Comment |
|---|---------------------------------|--------------|------|--|
| MP-RB-SW-08L-120418 | Copper, Dissolved | U | | Negated due to EB Action |
| MP-RB-SW-01-120418 MP-RB-SW-02-120418 MP-RB-SW-07-120418 MP-RB-SW-07D-120418 MP-RB-SW-04-120418 MP-RB-SW-05-120418 MP-RB-SW-06-120418 MP-RB-SW-08-120418 | Zinc, Dissolved | U | | Negated due to EB Action |
| MP-RB-SED-07-120418 MP-RB-SED-07D-120418 | Manganese, Total Zinc, Total | J | I | FD imprecision + % Solids < 30% |
| MP-RB-SED-04-120418 | Manganese, Total | J | I | High MS recovery + Lab Duplicate imprecision + %Solids < 30% |
| All remaining Sediment results | All 12 Total Metals | J or UJ | I | % Solids < 30% |

Qualifiers: U = Analyte is usable as a non-detect result at the “Reporting_Limit” field value in EDD;
UJ = Non-detect result is usable as an estimated RL; J = Result is usable as an estimated value (see DV Comment field for reason & bias); R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Abbreviations used in Table 2:

EB = field Equipment Blank
FD = Field Duplicate
MS = Matrix Spike

Arlington McClennen Park Detention Basins / Reeds Brook December 2018 Sampling by WHG

Date Sampled: 12/4/18No. Samples: 12SW; 8Sed; 1EBMethod of Analysis: ICP-MS Metals by EPA SW846 Method 6020B; Mercury by 7470A / 7471BMatrix: SW & Sediment

Data Validation Summary Table - EPA Stage 2B Metals

| QC Met Criteria? | Holding Time & Preserve | Calibration ICV / CCV %R | Calibration other: ICS / ICSAB Tune / IS %R | Lab Blanks | Field Blanks | LCS / LCSD %R / RPD | Matrix QC MS / MSD %R | Matrix QC LR / MSD RPD | Matrix QC Serial Dilution %D | Field Duplicate RPD | % Solids | Sensitivity Sample-Specific QLs | MCP Cert. Form |
|------------------|-------------------------|---|---|------------|--|---------------------|--------------------------------|--------------------------------|------------------------------|---------------------------------|---|---------------------------------|----------------|
| Yes | ✓ | Assumed acceptable unless narrated as CAM deviation | Assumed acceptable unless narrated as CAM deviation | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ |
| No | | | | | 9 results negated (U) due to EB action | | Estimate (J) 1 result; Bias: I | Estimate (J) 1 result; Bias: I | | Estimate (J) 4 results; Bias: I | Estimate (J/U) all Sed results; Bias: I | | |

See definitions of Data Validation Qualifiers at the end of this DV Checklist.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the MassDEP MCP CAM requirements and EPA DV guidance present in the data package? Yes. An MCP CAM-compliant data deliverable was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes.

▪ MassDEP Analytical Protocol Certification Form: The MCP required Certification Form was present in the data package and the required questions A through F were answered in the affirmative. Therefore, the data meet the "presumptive certainty" status under the MCP for LSP decisions. The "No" answer to question H has to do with matrix QC results (which were documented in the lab narrative, as required, and reviewed in this data validation and some of which affect the certainty of the results reported, as documented).

An EPA Stage 2B data validation review was performed for a project-specific list of 12 Metals by EPA SW846 Method 6020B, 7470A, & 7471B, using result forms, Quality Control forms, and review of laboratory narrative associated with this data package, which involved evaluation of the following: agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blanks (method, filter, and instrument blanks), Field blank results compared to field sample results; Field duplicate results; Quantitation limits and sample results; LCS/LCSD (or equivalent) results; MS/MSD results; Laboratory duplicate results; tabulated instrument QC, and evaluation of laboratory qualifiers applied to the dataset. Raw data are not reviewed during the EPA Stage 2B DV; therefore, instrument calibrations and instrument-specific QC are assumed to be acceptable unless otherwise noted in the laboratory narrative. The laboratory narrative was also reviewed to determine whether additional issues were found that were not reported in the QC evaluated.

Arlington McClennen Park Detention Basins / Reeds Brook December 2018 Sampling by WHG

Data Validation QA/QC Review Documentation EPA Stage 2B

12 surface water (SW) samples (includes 1 field duplicate) plus one equipment blank (EB) and 8 sediment (Sed) samples (includes 1 field duplicate) were collected for the McClennen Park Detention Basin / Reeds Brook environmental sampling, December 4, 2018. SW & Sed samples were collected and analyzed for project-specific list of 12 Metals: arsenic, barium, cadmium, chromium, copper, lead, iron, manganese, mercury, selenium, silver, and zinc. SW were analyzed for Dissolved Metals (lab-filtered; 0.45 µm) and Seds were analyzed for Total Metals.

Analyzed by EPA SW846 Method 6020B using MassDEP MCP CAM IIID (ICP-MS) protocols for all Metals except Mercury by EPA SW846 Method 7470A for SW and 7471B for Sed using MCP CAM IIIB (CVAA) protocols.

Samples reviewed are tabulated in the associated validated EDD.

Sample Receipt & Preservation: All samples received at lab on 12/5/19, 1 day after field samples collected. Cooler received within $4 \pm 2^{\circ}\text{C}$. All samples were received intact. Aqueous samples received unpreserved; lab-filtered and then preserved to pH <2 with HNO_3 and held for 24h prior to digestion/analysis (separate communication with lab project manager, Liz Porta, Alpha). No chemical preservation required for soil samples for Metals analysis. No issues noted on the Chain-of-Custody or lab's Sample Receipt Checklist. Acceptable receipt and preservation.

▪ Holding Times:

Analysis:

ICP-MS Metals by 6020B: 12/18/18. - 12/20/18 Acceptable HT.

Mercury in SW by 7470A: 12/13/18. Acceptable HT.

Mercury in Sed by 7471B: 12/21/18. Acceptable HT.

▪ Lab Blanks: Contamination observed in Lab method blanks were evaluated. It was assumed that instrument blanks (ICBs & CCBs) were acceptable unless otherwise narrated as a deviation of the CAM. Only the highest associated lab blank result per batch per metal used to take blank actions.

Blank Actions for ICP-MS Method 6020B: 2 Lab Method Blanks (MB) were associated with the samples in this SDG: WG1190316-1 for SW and WG1190565-1 for Sed. The MBs were non-detect for all ICP-MS Metals except for iron in the SW MB. Iron was detected at a level < RL at 0.059 J mg/L. No blank actions were required for iron "J" results < RL associated with the SW samples as all sample results were detected > RL for iron. No Lab Blank Actions were required.

Blank Actions for CVAA Methods 7470A/7471B: 2 Lab Method Blanks (MB) were associated with the samples in this SDG: WG1188563-1 for SW and for WG1188095-1 for Sed. The MBs were non-detect for mercury by CVAA methods. No Lab Blank Actions were required.

▪ Field Equipment blanks: Field Equipment Blank (EB) sample MP-SW-EB-120418 was collected associated with the SW samples. All dissolved Metals were nondetect except for copper, iron, and zinc. ***Blank actions taken to negate 9 results due to detection in associated EB are listed on the attached Blank Action Worksheet.***

▪ LCS/LCSD: Laboratory Control Sample (LCS) and LCS Duplicate (LCSD) were analyzed for SW and Sed. The lab used a matrix-matched solid Standard Reference Material (SRM) Lot # D102-540 as the LCS/LCSD associated with the Sed samples and used vendor control-limits for QC acceptance. Recoveries and RPDs were acceptable based on CAM (see end of DV Checklist for acceptance criteria). These results are an indication of acceptable accuracy and precision for the lab performance of Metals by Methods 6020B, 7470A, and 7471B using MCP CAM protocols.

▪ **MS/MSD Recoveries:** Matrix Spike (MS) and MS Duplicate (MSD) recoveries were evaluated for the matrix QC performed on site samples MP-RB-SW-04-120418 and MP-RB-SED-04-120418, for SW and Sed, respectively. All recoveries met CAM acceptance criteria, except as follows: iron showed high MS recovery (>125%) but acceptable MSD recovery for SW and high MS recovery in Sed; manganese showed high MS recovery in Sed. No action taken for iron in SW since the MSD recovery and the RPD between the MS & MSD were acceptable. No action taken for iron in Sed since the sample concentration was > 4x the spike level for iron and thus not applicable (the spike was "swamped-out"). DV Action taken for Manganese. These matrix QC results indicate acceptable accuracy for all Metals in SW and Sed except Manganese in Sed sample MP-RB-SED-04-120418. → **ACTION: Estimate (J) Manganese result in sample MP-RB-SED-04-120418 due to High MS recovery. Professional judgment used to take DV Action only on the sample used for the matrix QC due to potential heterogeneity in Sediments. The estimated result has an indeterminate bias due to additional exceedance of Lab Duplicate precision (see below), which indicates sediment sample heterogeneity at this location.**

▪ **Lab Duplicate (Replicate) and MS/MSD RPDs:** MS/MSD precision was evaluated for SW on sample MP-RB-SW-04-120418 and Lab Duplicate precision was evaluated on sample MP-RB-SED-04-120418. All met CAM RPD acceptance criteria except for Manganese (RPD >35%). These matrix QC results indicate acceptable precision for all Metals in SW and Sed except Manganese in Sed sample MP-RB-SED-04-120418. → **ACTION: Estimate (J) Manganese result in sample MP-RB-SED-04-120418 due to Lab Duplicate imprecision. Professional judgment used to take DV Action only on the sample used for the matrix QC due to potential heterogeneity in Sediments. The estimated result has an indeterminate bias.**

▪ **Serial Dilution:** Performed on site samples MP-RB-SW-04-120418 and MP-RB-SED-04-120418, for SW and Sed, respectively. All results that were > 50xMDL met % Difference criteria for SW and Sed. No action required.

▪ **Sensitivity:** All Metals QLs (RLs) for non-detected (reported as "ND" on the result forms in the lab data package and qualified as "U" in the EDD) results were reported on a sample-specific basis in units of mg/L for SW and mg/Kg dry-weight for Sed. All Metals QLs for non-detected results are considered acceptable compared to the CAM requirements, which are to meet the Method 1 standards unless otherwise indicated. The lab reported the RL = MDL for these data. No lab "J" data (< RL) were reported for field samples.

▪ **Lab Narrative:** Included all issues that required explanation from the MassDEP Analytical Protocol Certification Form and all issues previously reviewed in this validation. No action required.

▪ **% Solids:** All Sed samples had % Solids < 30%. Data users should consider that these results may have some uncertainty due to the difficulty in obtaining a representative sample for analysis of very wet sediments. EPA New England Environmental Data Review Supplement, April 2013, requires estimating (J/UJ) data from samples with < 30% solids. → **ACTION: Estimate (J/UJ) all Sed results due to % solids <30%. Estimated results have an indeterminate bias.**

Field Duplicate Samples: Field Duplicate (FD) samples included in this SDG for Metals were: MP-RB-SW-07-120418 / MP-RB-SW-07FD-120418 for SW and MP-RB-SED-07-120418 / MP-RB-SED-07FD-120418 for Sed. FD precision was acceptable for all Metals in the SW FD samples but exceeded FD precision criteria set as RPD 50% (professional judgment and EPA guidance) for Manganese and Zinc in Sed. These FD results indicate acceptable precision and representativeness of the SW sample to the location for Metals analyzed but imprecision and heterogeneity for Manganese and Zinc in Sediment. See the following tables for calculations of relative percent difference (RPDs) and FD DV Actions.

Arlington McClennen Park Detention Basins / Reeds Brook December 2018 Sampling by WHG

Field Duplicate Precision Calculations - Surface Water

| Analyte | Sample: MP-RB-SW-07-120418 (mg/L) | FD: MP-RB-SW-07FD-120418 (mg/L) | Precision RPD % | Action | Comment |
|-----------|---|---------------------------------------|-----------------------|--------|---------|
| Arsenic | 0.0005 U | 0.0005 U | NC | none | |
| Barium | 0.0548 | 0.0536 | 2 | none | |
| Cadmium | 0.0005 U | 0.0005 U | NC | none | |
| Chromium | 0.0017 | 0.0015 | 13 | none | |
| Copper | 0.002 | 0.0018 | 11 | none | |
| Iron | 2 | 1.79 | 11 | none | |
| Lead | 0.001 U | 0.001 U | NC | none | |
| Manganese | 0.1374 | 0.1351 | 2 | none | |
| Mercury | 0.0002 U | 0.0002 U | NC | none | |
| Selenium | 0.005 U | 0.005 U | NC | none | |
| Silver | 0.0005 U | 0.0005 U | NC | none | |
| Zinc | 0.0182 U | 0.0185 U | NC | none | |
| Hardness | 95.2 | 95 | 0 | none | |

Field Duplicate Precision Calculations - Sediment

| Analyte | Sample: MP-RB-SED-07-120418 (mg/Kg dry wt.) | FD: MP-RB-SED-07FD-120418 (mg/Kg dry wt.) | Precision RPD % | Action | Comment |
|-----------|---|---|-----------------------|--------|--|
| Arsenic | 15.7 | 25.3 | 47 | none | |
| Barium | 78 | 121 | 43 | none | |
| Cadmium | 1.237 | 0.9519 U | NC | none | |
| Chromium | 32.5 | 51.3 | 45 | none | |
| Copper | 48 | 74.1 | 43 | none | |
| Iron | 37800 | 57800 | 42 | none | |
| Lead | 114 | 163 | 35 | none | |
| Manganese | 392 | 671 | 52 | J both | FD imprecision; evidence of sediment heterogeneity |
| Mercury | 0.289 U | 0.32 U | NC | none | |
| Selenium | 8.7 U | 9.52 U | NC | none | |
| Silver | 2.18 U | 2.38 U | NC | none | |
| Zinc | 484 | 264 | 59 | J both | FD imprecision; evidence of sediment heterogeneity |
| % Solids | 22.1 | 19.6 | 12 | none | |

NA = Not Analyzed; NC = Not calculated

Summary of QC Actions - based on MassDEP MCP CAM, EPA DV Guidance, & professional judgment:

| QC Measure | Criteria | DV Actions |
|--------------------------------|------------------------------------|---|
| Preservation Holding Time (HT) | method criteria | HT: Analysis ICP metals by 6020: HT is 180d; Mercury by 7470 or 7471 HT is 28d from sample collection. Actions: exceedance of 1xHT: J/UJ. Exceedance of 2xHT use professional judgment (consider if > 2x HT exceedance, may reject, R, non-detects). Temperature: outside control limits of 4 ± 2 °C: use professional judgment. Preservation: Aqueous Total: pH > 2: use professional judgment to qualify results. |
| Blanks: | Non-detect < QL | Lab Prep / Method Blank, instrument blanks (ICB/CCB): detected results \geq QL and < Blank Level, negate "U" in sample at level found; detected results < QL and < Blank Level negate "U" at level of QL; Negative drift for any associated blank (-RL): use professional judgment. Field Blanks: non-matrix-matched FB: example: aqueous FB with soil/sed samples: use professional judgment to qualify associated results as "J+" biased high. |
| MS/MSD: | 75-125% | %R < 75%: J / UJ; %R > 125%: J detects; %R < 30%: J detects / R non-detects. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out"). Also consider Post-digestion spike recovery for actions. Professional judgment allowed for determining whether actions affect all samples in batch or only the sample used for MS/MSD. |
| LCS/LCSD: | 80-120% Aq | %R < 80%: J / UJ. %R > 120%: J detects. %Rec < 50%, use professional judgment. Use vendor control limits for Solid SRM used for LCS. Aq RPD > 20% or So RPD > 30% J / UJ. Actions affect all samples in batch. |
| MD/MSD: or Lab Replicates | RPD \leq 20% Aq \leq 35% So | Aq RPD > 20% / Solid RPD > 35% [EPA RPD]: apply only to results > 5xQL: Action: J/UJ affected results. |
| | | Aq Results < 5xQL / Solid Results < 5xQL: difference > \pm QL for Aq or 2xQL for Solid. Action: J/UJ affected results. |
| Field Duplicate (FD): | | Aq RPD > 30% / Solid RPD > 50% for results > 5xQL: Action: J/UJ paired results. |
| | | Results < 5xQL: use professional judgment (consider difference > \pm 2xQL). Action: J/UJ FD paired results only. |
| ICV/CCV: | 90-110% except mercury: 80-120% | Recoveries < 90%: J / UJ except mercury, %R ,80% J / UJ (lab limits); recoveries > 110%: J detects except mercury, %R > 120% J detects; if severe exceedance < 75%: R non-detects & J: detects; > 160%: R detects. |
| CRI or Low-Level PQL standard: | 70-130% prof. judgment | Not required but if performed, use professional judgment to qualify data (no EPA National Functional criteria). Consider: Results < 2xCRI: < 70% (or < 50% Sb, Pb, Tl): J / UJ; > 130% (or > 150% Sb, Pb, Tl): J detects. |

Summary of QC Actions - continued

| QC Measure | Criteria | DV Actions |
|---|----------------|--|
| ICSA/AB: | 80-120% method | Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects. Potential false positives and false negatives: use professional judgment to evaluate (see lab IECs for ICP instrument) and in consideration of sample-specific interferent concentrations. |
| Serial Dil.: | < 15%D | Results > 50xMDL: % Difference > 15%: J/UJ. Use professional judgment on whether it is a suppression or enhancement to qualify associated results. EPA National Functional Guidelines allow for %D 15% criterion for solids. |
| Tune: | 6020 method | Tune not performed properly: use professional judgment. Resolution of mass calibration > $\pm 0.1 \mu$ or % RSD > 5%: UJ non-detects / J detects. Tune criteria for Method 6020 only (ICP-MS). |
| Internal Standard (IS): | >60% method | IS recovery < 60% [EPA criteria]: J detects / UJ non-detects. IS criteria for Method 6020 only (ICP-MS). |
| Sensitivity: | | MCP Method 1 Standards - Applicable standards for surface water and sediment Achieved QLs / RLs for non-detects must be < applicable Method 1 Standards or risk-based levels of concern for SW and Sediment. |
| % Solids | | % Solids < 30%: J / UJ all results with indeterminate bias (EPA New England guidance) based on difficulty in obtaining a representative aliquot of the sample for analysis. |
| References: | | <ul style="list-style-type: none"> ▪USEPA <i>National Functional Guidelines for Inorganic Superfund Methods Data Review</i>, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017. ▪USEPA <i>Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i>, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009. ▪USEPA <i>Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i>, Third Edition, Revision 1, December 1996 and updates, including methods: 6020B – Inductively Coupled Plasma Mass Spectrometry. ▪MassDEP WSC-CAM-IVA: <i>Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the Massachusetts Contingency Plan (MCP)</i>, Revision No. 1, July 2010. ▪MassDEP WSC-CAM-IIID: <i>Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)</i>, Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, Revision No. 1, July 2010. ▪MassDEP WSC-CAM-IIIB: <i>Quality Control Requirements and Performance Standards for the Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrometry in Support of Response Actions under the Massachusetts Contingency Plan (MCP)</i>, Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, Revision No. 1, July 2010. ▪MassDEP Policy #WSC-07-350: <i>Representativeness and Data Usability Guidance</i>, 2007 |
| <p><u>Qualifiers:</u> U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; J+ = result is usable as an estimated value with a potential high bias; J- = result is usable as an estimated values with a potential low bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate. QC Limits based on MCP CAM and EPA method QC acceptance criteria, EPA DV guidance, and professional judgment, as listed above.</p> | | |

| Sample_Comp_Name | Lab_Sample_N | Analyte_Name | Result | Result_Qual | Units_of_M | Reporting_L | Dilution_Fa | DV Action | DV Qual | Comments |
|----------------------|--------------|-------------------|--------|-------------|------------|-------------|-------------|-----------|---------|--------------------------|
| MP-SW-EB-120418 | L1849652-13 | Copper, Dissolved | 0.0011 | | mg/l | 0.001 | 1 | | | |
| MP-RB-SW-01-120418 | L1849652-01 | Copper, Dissolved | 0.0024 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-02-120418 | L1849652-02 | Copper, Dissolved | 0.0022 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-03-120418 | L1849652-03 | Copper, Dissolved | 0.002 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-04-120418 | L1849652-06 | Copper, Dissolved | 0.0021 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-05-120418 | L1849652-07 | Copper, Dissolved | 0.0019 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-06-120418 | L1849652-08 | Copper, Dissolved | 0.0021 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-07-120418 | L1849652-04 | Copper, Dissolved | 0.002 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-07FD-120418 | L1849652-05 | Copper, Dissolved | 0.0018 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-08-120418 | L1849652-11 | Copper, Dissolved | 0.0017 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-SW-08L-120418 | L1849652-12 | Copper, Dissolved | 0.0011 | | mg/l | 0.001 | 1 | Negate | U | Negated due to EB action |
| MP-RB-UW-01-120418 | L1849652-09 | Copper, Dissolved | 0.0074 | | mg/l | 0.001 | 1 | No Action | | |
| MP-RB-UW-02-120418 | L1849652-10 | Copper, Dissolved | 0.0215 | | mg/l | 0.001 | 1 | No Action | | |
| MP-SW-EB-120418 | L1849652-13 | Iron, Dissolved | 0.071 | | mg/l | 0.065 | 1 | | | |
| MP-RB-SW-01-120418 | L1849652-01 | Iron, Dissolved | 1.8 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-02-120418 | L1849652-02 | Iron, Dissolved | 1.69 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-03-120418 | L1849652-03 | Iron, Dissolved | 2 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-04-120418 | L1849652-06 | Iron, Dissolved | 1.85 | | mg/l | 0.05 | 1 | No Action | | |
| MP-RB-SW-05-120418 | L1849652-07 | Iron, Dissolved | 1.72 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-06-120418 | L1849652-08 | Iron, Dissolved | 4.63 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-07-120418 | L1849652-04 | Iron, Dissolved | 2 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-07FD-120418 | L1849652-05 | Iron, Dissolved | 1.79 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-08-120418 | L1849652-11 | Iron, Dissolved | 1.91 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-SW-08L-120418 | L1849652-12 | Iron, Dissolved | 8.98 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-UW-01-120418 | L1849652-09 | Iron, Dissolved | 1.91 | | mg/l | 0.065 | 1 | No Action | | |
| MP-RB-UW-02-120418 | L1849652-10 | Iron, Dissolved | 2.1 | | mg/l | 0.065 | 1 | No Action | | |
| MP-SW-EB-120418 | L1849652-13 | Zinc, Dissolved | 0.0212 | | mg/l | 0.01 | 1 | | | |
| MP-RB-SW-01-120418 | L1849652-01 | Zinc, Dissolved | 0.0172 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-02-120418 | L1849652-02 | Zinc, Dissolved | 0.0173 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-03-120418 | L1849652-03 | Zinc, Dissolved | 0.0247 | | mg/l | 0.01 | 1 | No Action | | |
| MP-RB-SW-04-120418 | L1849652-06 | Zinc, Dissolved | 0.0206 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-05-120418 | L1849652-07 | Zinc, Dissolved | 0.0104 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-06-120418 | L1849652-08 | Zinc, Dissolved | 0.0205 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-07-120418 | L1849652-04 | Zinc, Dissolved | 0.0182 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-07FD-120418 | L1849652-05 | Zinc, Dissolved | 0.0185 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-08-120418 | L1849652-11 | Zinc, Dissolved | 0.0183 | | mg/l | 0.01 | 1 | Negate | U | Negated due to EB action |
| MP-RB-SW-08L-120418 | L1849652-12 | Zinc, Dissolved | 0.0563 | | mg/l | 0.01 | 1 | No Action | | |
| MP-RB-UW-01-120418 | L1849652-09 | Zinc, Dissolved | 0.0948 | | mg/l | 0.01 | 1 | No Action | | |
| MP-RB-UW-02-120418 | L1849652-10 | Zinc, Dissolved | 0.3141 | | mg/l | 0.01 | 1 | No Action | | |

MEMORANDUM

DATE December 18, 2018

TO Arlington Conservation Commission

FROM Joseph Famely
Direct Phone: (508) 495-6220
jfamely@woodsholegroup.com

Reeds Brook Fall 2018 Sediment Observations

The following map and photographs document Woods Hole Group's observations made in Reeds Brook at McClennen Park on December 4, 2018.

We observed two types of possible iron impacts on the substrate of Reeds Brook:

1. Loose organic floc of a dull orange tinge that has accumulated on the leaf litter and among the bases of emergent wetland vegetation. This material is easily disturbed and likely gets flushed out of the higher flow areas, especially during storm events.
2. Orange floc/staining on a portion of the sediment particles. This condition is only at the sediment surface in a very localized area, and affects a very small proportion of the sediment particles in place (i.e. its occurrence is diffuse).

Based on these conditions and on observations of biological activity (songbirds, mallards, buffleheads, heron, sunfish, and benthic invertebrates such as water boatmen, larval dragonflies, and larval hellgrammites) throughout Reeds Brook, we do not believe the floc constitutes a condition of readily apparent harm.

107 Waterhouse Road, Bourne, MA 02532 USA

T: +1 508.540.8080 F: +1 508.540.1001



107 Waterhouse Road, Bourne, MA 02532 USA

T: +1 508.540.8080 F: +1 508.540.1001

Areas with no observed floc (MP3A, MP3B, MP4A, MP4B, MP4C, MP5A, MP5B, MP5C):



107 Waterhouse Road, Bourne, MA 02532 USA

T: +1 508.540.8080 F: +1 508.540.1001

Areas with dull orange organic floc settled on surface of vegetation but highly susceptible to mobilization (MP1A, MP2A, MP6A, MP5B, MP5C):



107 Waterhouse Road, Bourne, MA 02532 USA

T: +1 508.540.8080 **F:** +1 508.540.1001

Areas with dispersed (<5% coverage) orange floc on sediment surface (MP6B, MP7B):



107 Waterhouse Road, Bourne, MA 02532 USA

T: +1 508.540.8080 **F:** +1 508.540.1001

McClennen Park / Reeds Brook Water Quality - Dec 2018
Arlington, MA

| SampleID | Date Time M/D/Y HH:MM:SS | Temp °C | SpCond uS | Salinity ppt | Depth meters | pH | pH mV | Orp mV | Turbidity NTU | ODO % sat | ODO mg/L | Baro mmHg | Battery volts |
|----------|-----------------------------|------------|--------------|-----------------|-----------------|------|----------|-----------|------------------|--------------|-------------|--------------|------------------|
| RB01 | 12/4/2018 9:08 | 6.49 | 1136 | 0.57 | 0.274 | 7.43 | -30.2 | 58.8 | -11.2 | 60.8 | 7.45 | 751.2 | 12.4 |
| RB02 | 12/4/2018 9:19 | 5.32 | 877 | 0.43 | 0.284 | 7.46 | -31.2 | -310.6 | -11.1 | 78.9 | 9.97 | 750.9 | 12.4 |
| RB03 | 12/4/2018 9:35 | 7.7 | 804 | 0.4 | 0.28 | 7.22 | -21.7 | -230.9 | 3.2 | 84.9 | 10.1 | 750.9 | 12.3 |
| RB04 | 12/4/2018 10:08 | 5.03 | 817 | 0.4 | 0.267 | 6.96 | -11.2 | -191.6 | -13 | 74.6 | 9.5 | 751.1 | 12.3 |
| RB05 | 12/4/2018 10:18 | 5.03 | 686 | 0.33 | 0.296 | 6.94 | -10.1 | -213.4 | -1.9 | 79.3 | 10.09 | 731.6 | 12.4 |
| RB06 | 12/4/2018 10:30 | 7.41 | 756 | 0.37 | 0.294 | 6.93 | -9.8 | -189.7 | -18 | 101.6 | 12.18 | 751.2 | 12.3 |
| RB07 | 12/4/2018 9:53 | 5.36 | 819 | 0.4 | 0.261 | 7.12 | -17.7 | -236.7 | -13.4 | 91.9 | 11.6 | 750.9 | 12.3 |
| RB08 | 12/4/2018 10:42 | 5.58 | 823 | 0.4 | 0.473 | 7.08 | -16 | -172.3 | -14.1 | 84.8 | 10.64 | 751.2 | 12.3 |
| RB08_L | 12/4/2018 10:48 | 9.17 | 14030 | 8.12 | 1.174 | 7.08 | -15.7 | -223.1 | -13.2 | 35.2 | 3.84 | 751.3 | 12.3 |
| UW01 | 12/4/2018 11:49 | 4.15 | 905 | 0.44 | 0.276 | 7.29 | -24.2 | -368.6 | -16.6 | 47.1 | 6.13 | 751.1 | 12.3 |
| UW02 | 12/4/2018 12:03 | 4.7 | 785 | 0.38 | 0.26 | 6.87 | -7.6 | -345.5 | -16.1 | 35.5 | 4.55 | 751.1 | 12.3 |